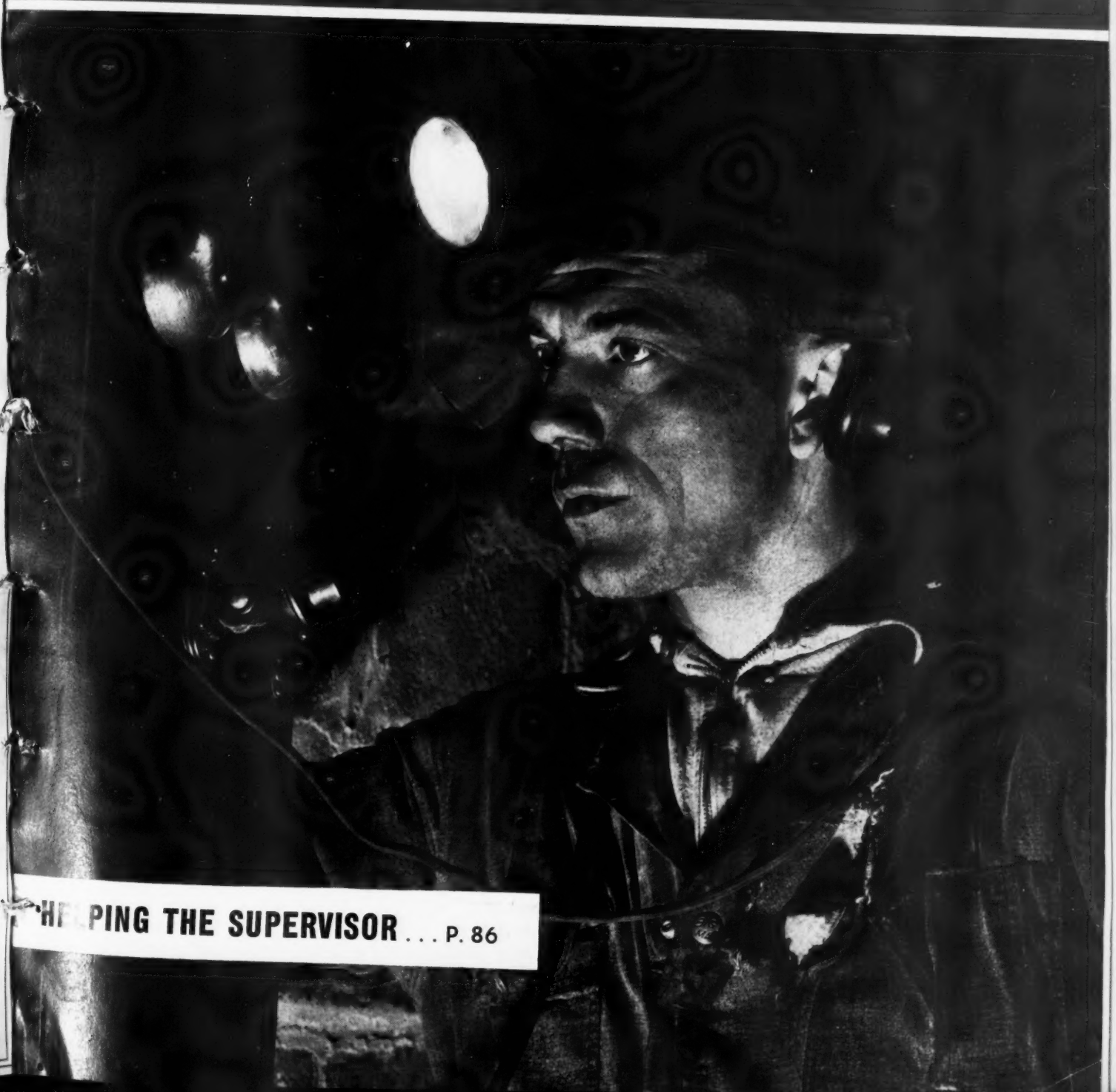
Coal Age

DETROIT

APRIL, 1945



HELPING THE SUPERVISOR . . . P. 86

SOLNUS OIL . . .

Lowers Bearing-Temperature on Generator, Ends Oil-Throw, Averts Costly Shutdown

While ring-oiled bearings are usually considered a routine matter, here is a case from the Sun industrial files that demonstrates the need for the right oil in the right place — even in simple applications.

An eastern operator called in the local Sun Engineer to study the bearings of the main generator in his power-plant. Bearing-temperatures were high, and the lubricant was being thrown off onto the generator-coils.

Serious injury to the generator — which would have forced a shutdown of the whole plant for an indefinite period — was avoided when they switched to the Solnus Oil recommended by the Sun Engineer.

Bearing-temperatures dropped, and throw-off of oil was reduced to a minimum. The operator now uses Solnus Oil for all his ring-oiled, electric motors.

In mine after mine, Sun Engineers and Sun lubricants have helped coal operators to avoid shutdowns, to increase net production, and to cut maintenance-costs. From mine face to tipple, Sun manufactures a complete line of quality lubricants for all types of power-equipment, for all types of mining and coal-handling machinery. Call the local Sun Engineer near you — or write direct to . . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

TECHNOLOGY DEPT!

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DETROIT

How to keep an office building from jumping around

A typical example of B. F. Goodrich development in rubber

TENANTS howled when they heard an industrial laboratory was going into their office building. They knew the nerve-shattering noise and vibration a big 3-ton press would make.

But the company had to have its laboratory close to its offices for quick action in its vital war work. Comfort for 200 tenants, or convenience for one? They got both — because the trouble was anticipated.

The company had had experience in its factory with Vibro-insulators — a pre-war B. F. Goodrich development. Vibro-insulators are used to support even heavy industrial machines as if they are hanging or floating *on rubber.* In factories they keep vibration from passing through floors and walls; and with vibration gone most noise goes too. Hundreds of thousands of them are in use right now in delicate electronic devices to prevent vibration from getting inside and causing harm.

The big press was mounted on a number of these B. F. Goodrich Vibro-insulators. (You can see them in the picture taken before the press was installed.) It has been operating for months and the other tenants have yet to hear their first sound, yet to feel their first shiver.

B. F. Goodrich Vibro-insulators are conquering noise and destructive vibration in almost every place that vibration needs to be stopped. Vibro-insulators are another example of B. F. Goodrich research which is constantly improving both rubber and its applications, to make better and longer-lasting rubber goods for industry. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B. F. Goodrich

RUBBER *and* SYNTHETIC *products*

To do one thing and do it . . .

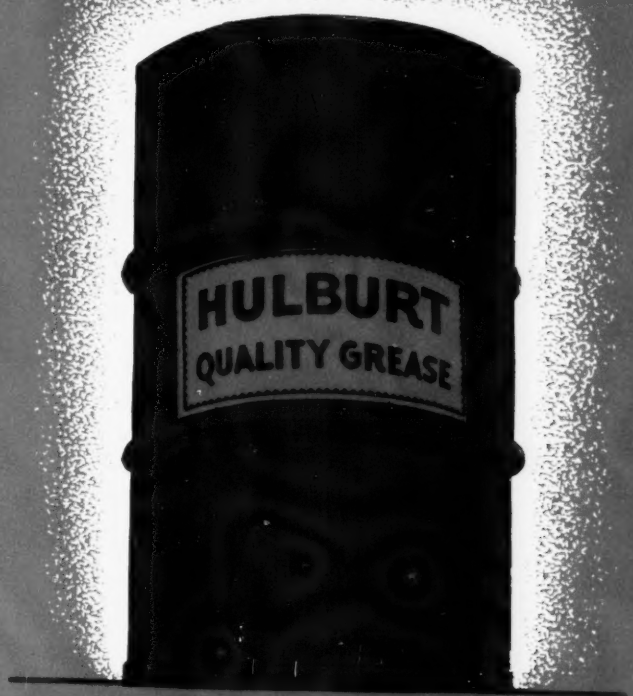
SAVING: a "movement" that started in 1816 when the Philadelphia Savings Fund Society founded the first, and the oldest, United States Savings Bank in America.

SAVING: another "movement" that began a quarter of a century ago when Hulburt Oil and Grease Company, of Philadelphia, offered QUALITY grease to coal mines for lubricating mine equipment.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

. SUPREMELY WELL



HULBURT *Quality* GREASE

PHILCO

gives you the latest in Modern Mine Battery Design!

HUNDREDS of mine locomotives and shuttle cars are now hauling more tons at lower cost because of the advanced research of Philco engineers in developing tougher, more powerful storage batteries. Philco long has led in providing batteries of maximum capacity, with the rugged long-life construction especially engineered for today's heavier work schedules. Now Philco engineering leadership is demonstrated anew with the mine battery that gives 30% longer life—the great new Philco "Thirty"! For less maintenance, reduced depreciation and lower cost of all battery-powered haulage equipment investigate the new Philco "Thirty" Mine Storage Battery. It is now available in preferred types. Complete information will gladly be sent on request. Philco Corporation, *Storage Battery Division,* Trenton 7, New Jersey.

For 50 years a leader in Mine Storage Battery Development

The new Philco "Thirty" with 30% longer life is identified by its distinctive red connectors.

Coal Age

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In Thousands of *WAR PLANTS*

GATES *Synthetic Rubber* V-Belts

—are giving *BETTER SERVICE*

Than Any V-Belts Ever Made of NATURAL RUBBER!

To meet the unprecedented severity of combat service on U. S. Army tanks, tractors and self-propelled big guns, Gates has developed and built synthetic rubber V-belts to far higher service standards than were ever required of pre-war, natural rubber V-belts!

- **The importance of this fact to industrial V-belt users is this:**

  Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

In the case of many other products, you must wait until after the war to get the benefit of war-time improvements. But victory depends upon production—and production depends upon V-belts which drive the producing machines. That is why Gates has been able to pass on to you immediately, in your Standard Gates Vulco Ropes, every V-belt improvement which Gates specialized research has developed for use in the Army's motorized equipment.

In addition, where V-belts of special construction are required your Gates Rubber Engineer can supply a Gates V-belt that is precisely engineered to meet your special needs. Whenever you have a drive problem or a V-belt problem, just pick up your telephone directory and look under the heading "Gates Rubber." The Gates Rubber Engineer will bring right into your plant the full benefits of every advance in V-belt construction that Gates specialized research has developed.

—and one of these 5 GATES V-belts will meet any Special need you may have.

- Rayon Cord V-Belts
- Static-Safety V-Belts
- *Special* Synthetic V-Belts
- Cotton Cord V-Belts
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Engineering Offices and Jobber Stocks in All Large Industrial Centers

Gates

The Mark of Specialized Research

454

GATES VULCO ROPE DRIVES

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COALMASTER'S BIG BITE HELPS FEED HUNGRY SHOVELS *Faster*

COALMASTER Strip Mine Drilling Tools have a never-ending appetite for work. They "chew up" holes faster—better—cheaper—because they are expertly engineered for "strip" requirements.

Such exclusive COALMASTER features as the Hexagon Coupling and new Spir-L-Weld Auger help drill straighter, cleaner holes with record speed. You can make substantial savings in manpower, time, and cost by retooling *now* with **COALMASTER DRILLING TOOLS**

DRILLING COALMASTER TOOLS

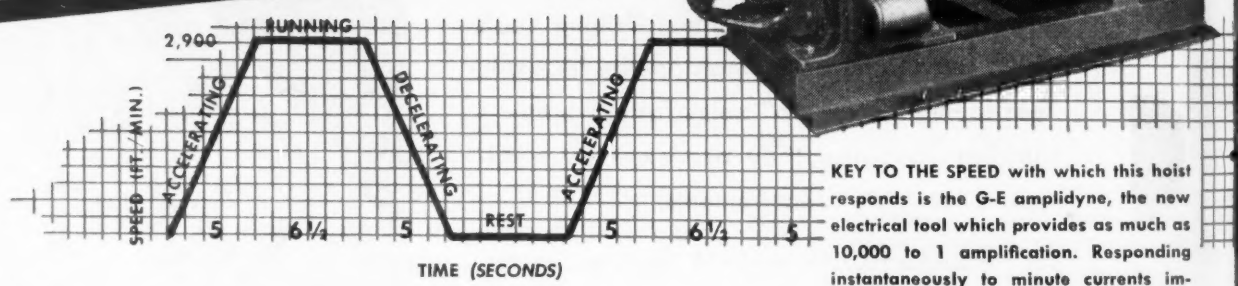
CENTRAL MINE EQUIPMENT CO.

ST. LOUIS 8, MO.

NEW AMPLIDYNE-CONTROLLED MINE HOIST

makes 167 trips PER HOUR

HOISTS 750 TONS OF COAL PER HOUR UP 487-FOOT SHAFT

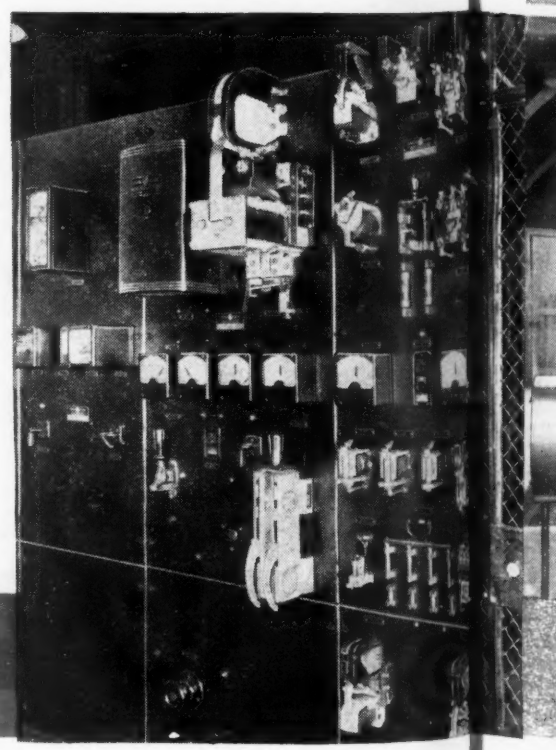


KEY TO THE SPEED with which this hoist responds is the G-E amplidyne, the new electrical tool which provides as much as 10,000 to 1 amplification. Responding instantaneously to minute currents impressed on its control field, the amplidyne furnishes the power to drive or control machines.

MINE cars don't pile up waiting for the hoist in the Pennsylvania mine where this new G-E drive is installed. Hoisting 4½-ton loads 487 feet in the almost unbelievable time of 16½ seconds, this hoist is making a truly remarkable record for tonnage handled.

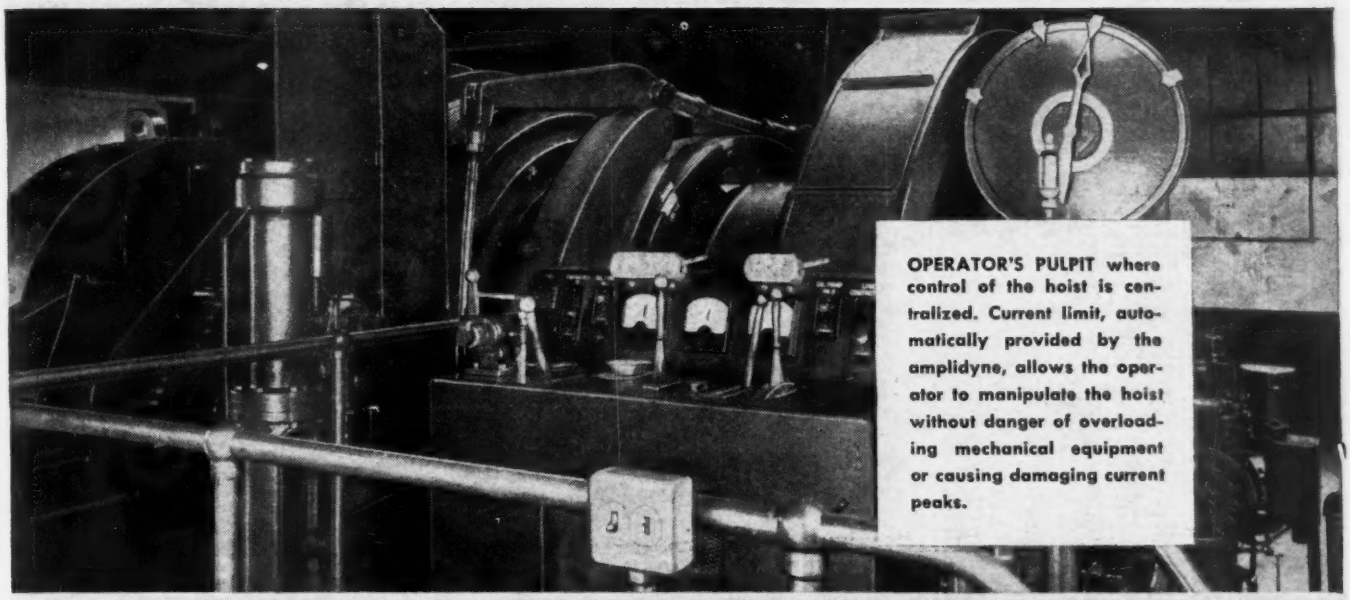
As the chart above shows, the amplidyne-controlled drive accelerates the fully loaded cage to running speed in 5 seconds, and decelerates it to a stop in the same time. In addition, the maximum running speed is 2900 feet per minute, which necessitates accurate and positive control. A complete trip is made every 21½ seconds: 10 to accelerate and decelerate; 6½ running at full speed; and 5 to dump and load. In continuous operation, the hoist thus makes 167 trips per hour; handles 750 tons of coal per hour.

If you are planning to install a new hoist, or to modernize one of your present drives, let G-E engineers give you the benefit of their practical experience with hoists of every type and size. The teamwork of amplidyne control and G-E hoist motors will give you the hoist you need to handle the tonnage you want —rapidly and safely. *General Electric Co., Schenectady 5, New York.*

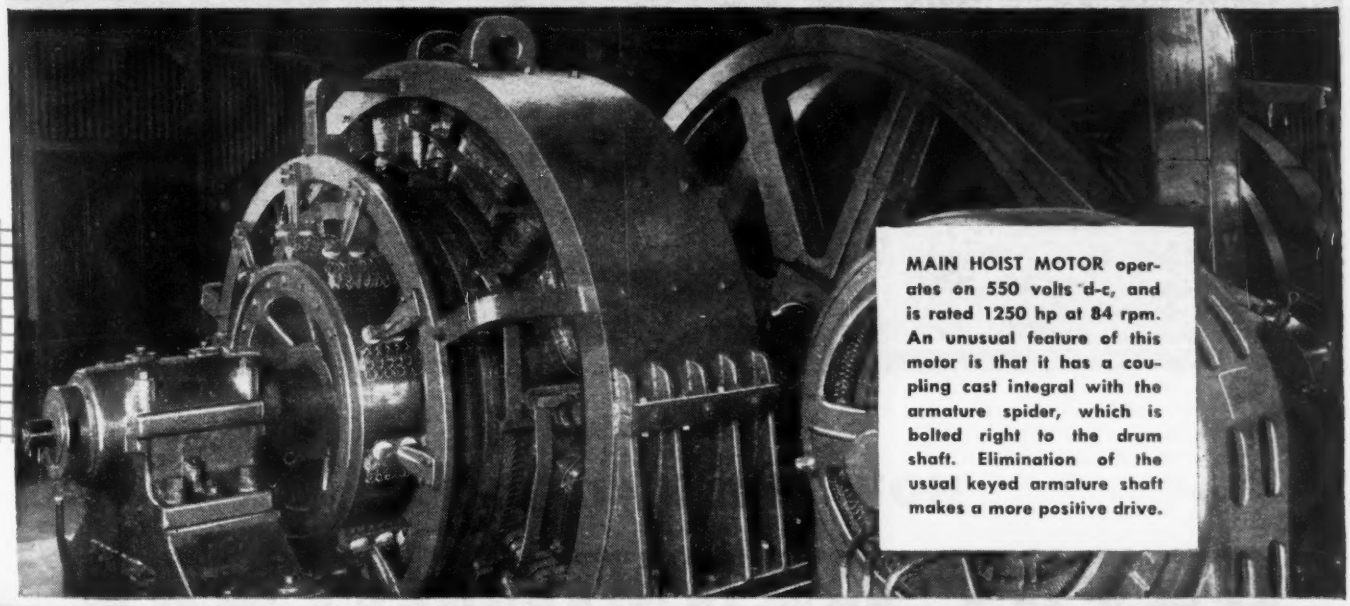


SIMPLICITY OF CONTROL is a big feature of the G-E amplidyne. Contrast the small size and small number of the devices on the amplidyne panel (right) with the many contactors and relays that would be required with conventional control. Left-hand panel controls the dynamic-braking exciter for the motor-generator. Center panel is the main d-c line panel.

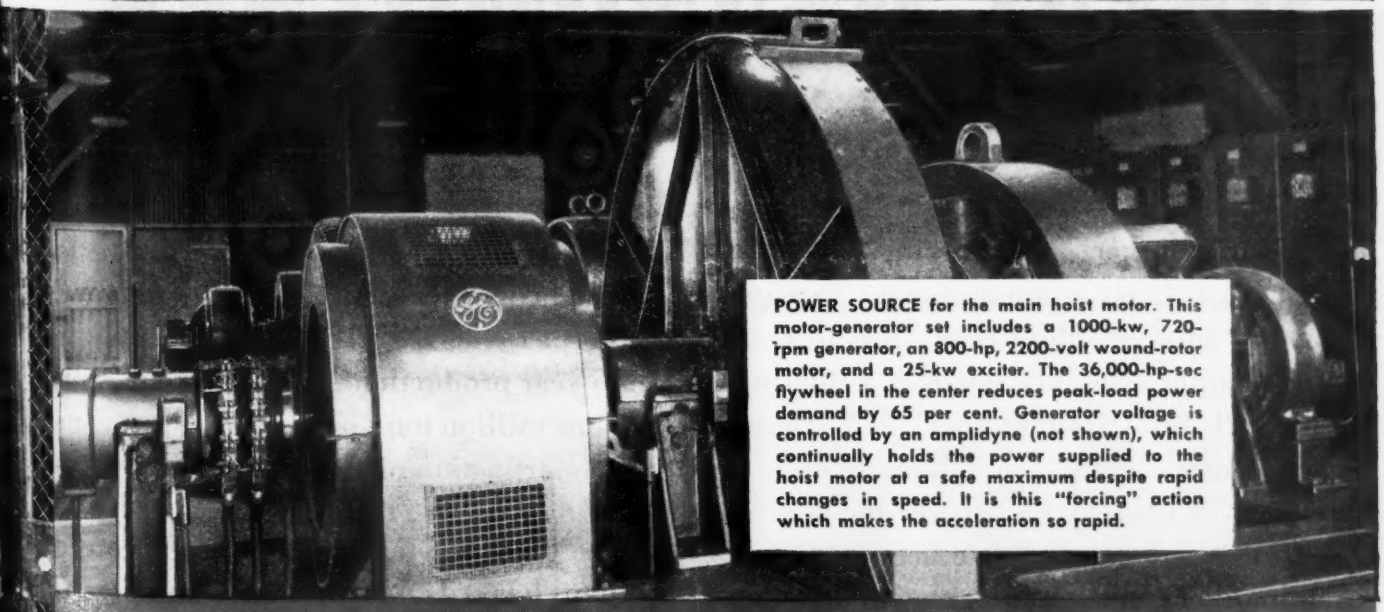
Buy all the BONDS you can —and keep all you buy



OPERATOR'S PULPIT where control of the hoist is centralized. Current limit, automatically provided by the amplidyne, allows the operator to manipulate the hoist without danger of overloading mechanical equipment or causing damaging current peaks.

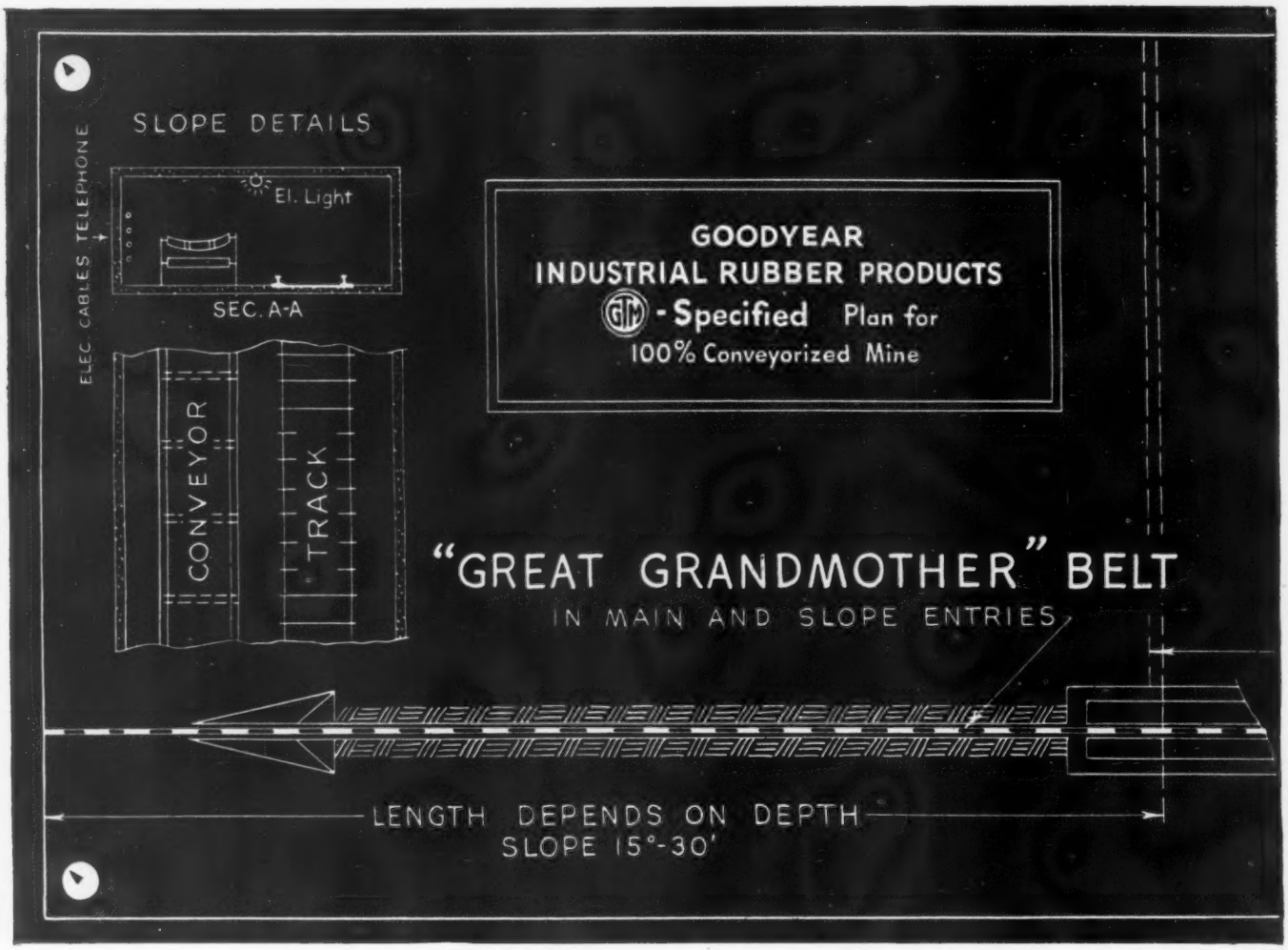


MAIN HOIST MOTOR operates on 550 volts d-c, and is rated 1250 hp at 84 rpm. An unusual feature of this motor is that it has a coupling cast integral with the armature spider, which is bolted right to the drum shaft. Elimination of the usual keyed armature shaft makes a more positive drive.



POWER SOURCE for the main hoist motor. This motor-generator set includes a 1000-kw, 720-rpm generator, an 800-hp, 2200-volt wound-rotor motor, and a 25-kw exciter. The 36,000-hp-sec flywheel in the center reduces peak-load power demand by 65 per cent. Generator voltage is controlled by an amplidyne (not shown), which continually holds the power supplied to the hoist motor at a safe maximum despite rapid changes in speed. It is this "forcing" action which makes the acceleration so rapid.

GENERAL ELECTRIC



HOW MUCH WOULD A

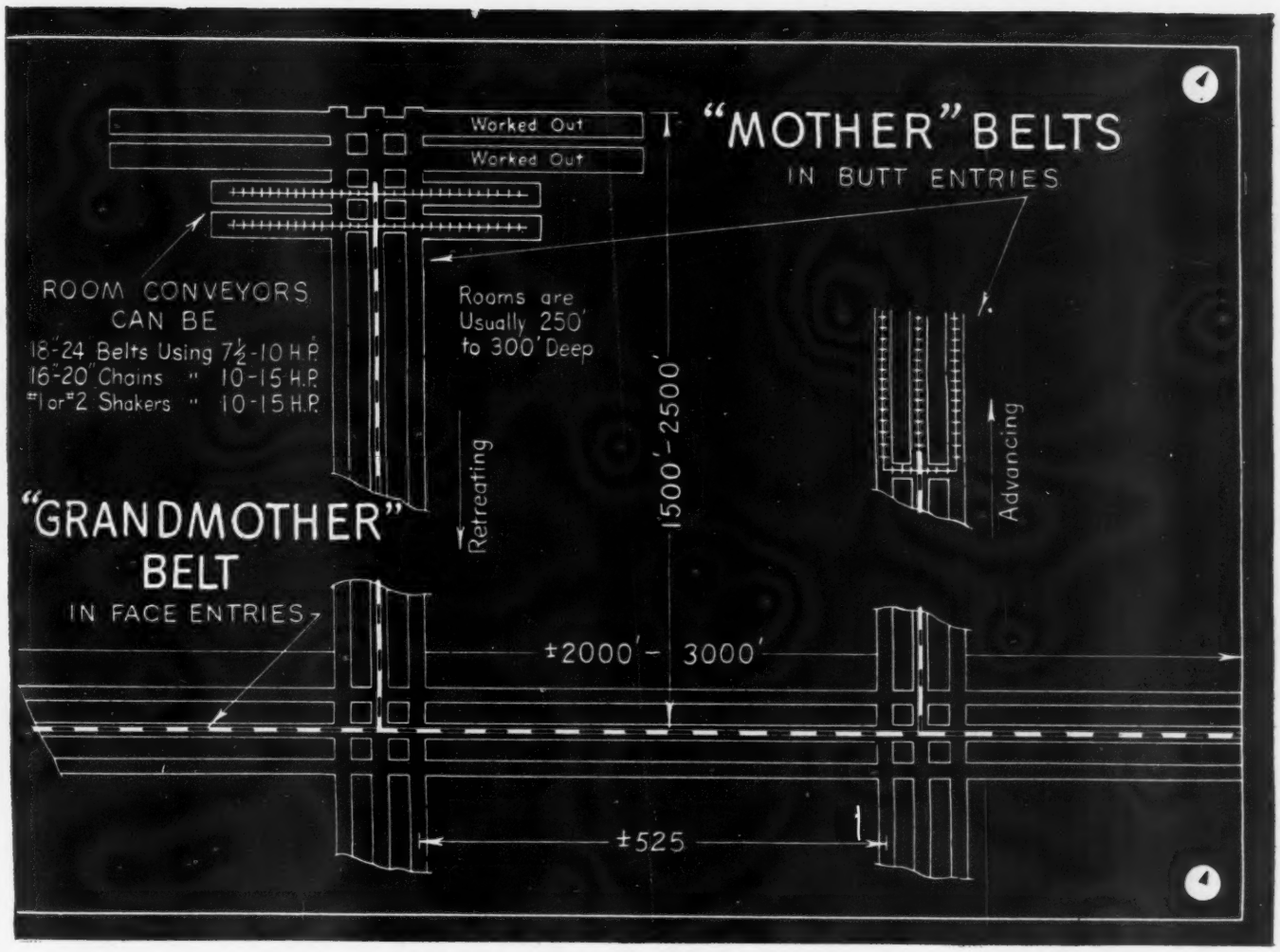
"GREAT GRANDMOTHER"

CUT YOUR COSTS ?

USE of "Mother" or gathering conveyor belts is fairly common today; perhaps your own mine employs them. But to reap the maximum economy possible with conveyors calls for "Grandmother" and "Great Grandmother" belts, too. "Grandmother" conveyors in face entries to carry the flow of coal from two or more belt mothers. A "Great Grandmother" in the main entry to take the coal outby, up the slope to the tipple.

With such a 100% conveyorized system, equipped with Goodyear "Coal-Flo" belts, you can bring out coal at a cost as low as TWO CENTS PER TON MILE with two million tons a year production — three to four cents with one million tons' output including complete amortization of the investment.

Beyond this, you eliminate many fire and accident hazards. Maintenance and power costs are far less. Less timbering, brushing and grading are required in opening new entries. Standby time is cut down; production



stepped up, because belts can take out as high as 2,800 tons per hour.

All these economies are multiplied when you install Goodyear "Coal-Flo" conveyor belts because of their proved longer life in mine service. They are armored against mildew, mine acids and bruising.

For an estimate of the total savings possible with complete conveyorization of your mine, call in the G.T.M.—Goodyear Technical Man. Just write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

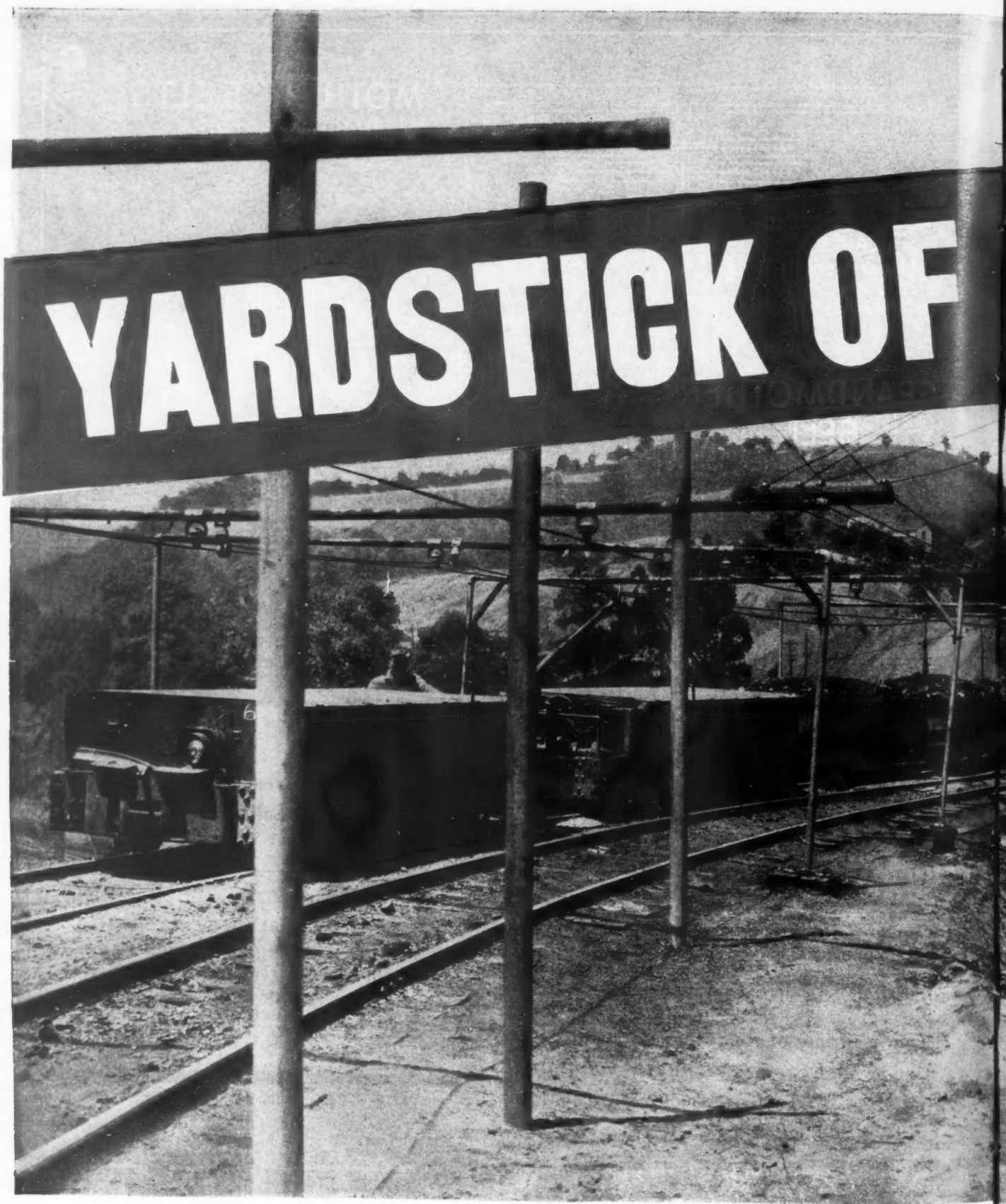
FOR HOSE, BELTING, PACKING, MOLDED RUBBER GOODS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

"Coal-Flo"—T. M. The Goodyear Tire & Rubber Co.

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR CONVEYOR BELTS THAN ON ANY OTHER KIND



TEXACO

REG. U.S. PAT. OFF.

TEXACO LUBRICANTS

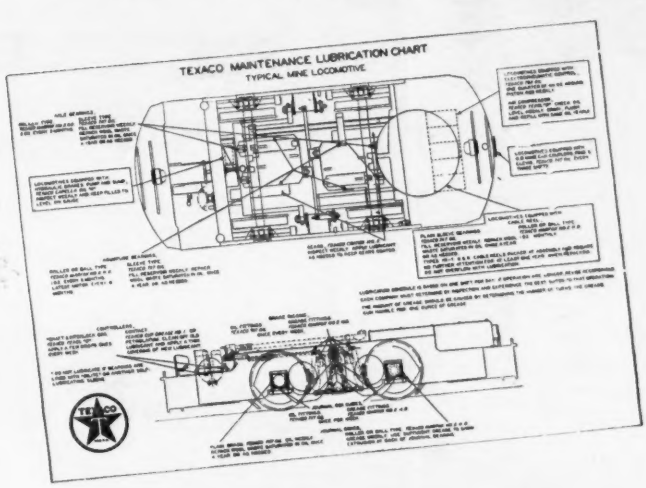
PRODUCTION

THE BEST yardstick of coal production is not so much the tonnage cut at the face, as the tonnage that's brought to the surface. Keeping this tonnage moving steadily calls for peak performance from loading and transportation equipment at all times.

Experienced operators everywhere know the importance of effective lubrication in achieving this goal. That is why so many of them use Texaco.

Texaco Marfak, for example, in both anti-friction and plain bearings of cutters, loaders, shuttle cars, locomotives, etc., provides ideal film lubrication inside the bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out dirt and water. Its tough, adhesive film cushions against shocks, and makes parts last longer.

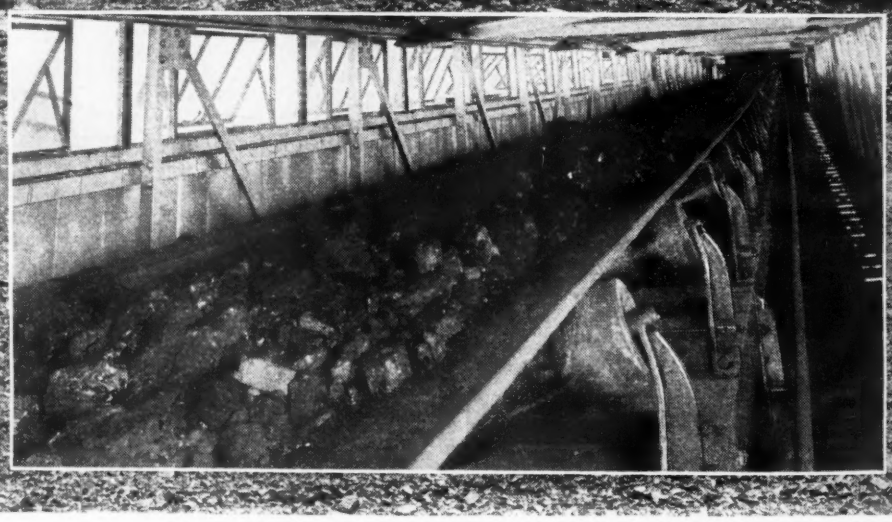
Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



FREE: Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery who approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly *where* to use Texaco, *when* and with *what* lubricant to service each lubrication point. Order the Charts you need by make and model of each machine.

For the Coal Mining Industry

RECORD



Main slope conveyor carries run-of-mine coal from underground hopper to top of preparation plant. Capacity 1,000 TPH. Belt is U.S. Matchless grade, 54 in. wide, 7-ply, 42-oz. duck; covers: top, 1/4 in., bottom, 1/16 in.

BREAKER

BUILT BY COORDINATED ENGINEERING

Here is another example of engineering teamwork in planning and building an efficient conveyor belt system.

Shown here is one of the two strip mines which established records for coal output for 1944 in their area—a record which has been continuously maintained.

In both cases United States Rubber Company technicians, teamworking with the engineers at the mine and the designers of mechanical equipment, produced the belts capable of handling this enormous volume on a profitable basis.

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York 20, N. Y. • *In Canada* Dominion Rubber Company, Ltd.

Get to Your Coal Quickly--Load It Out Profitably

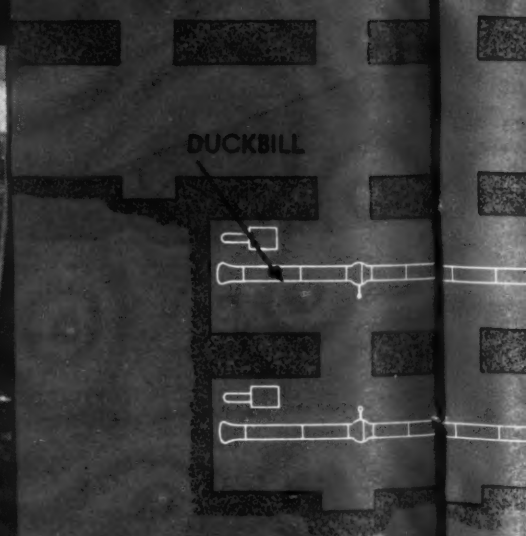
THE GOODMAN DUCKBILL-SHAKER

13219

No time is lost in the working cycle, all equipment is concentrated in one place. Face preparation and loading operations are synchronized and overlapped.

12417

There are no "bottle necks" at room discharge points where a high capacity Goodman belt conveyor receives the coal from shakers and transports it to the mine cars.



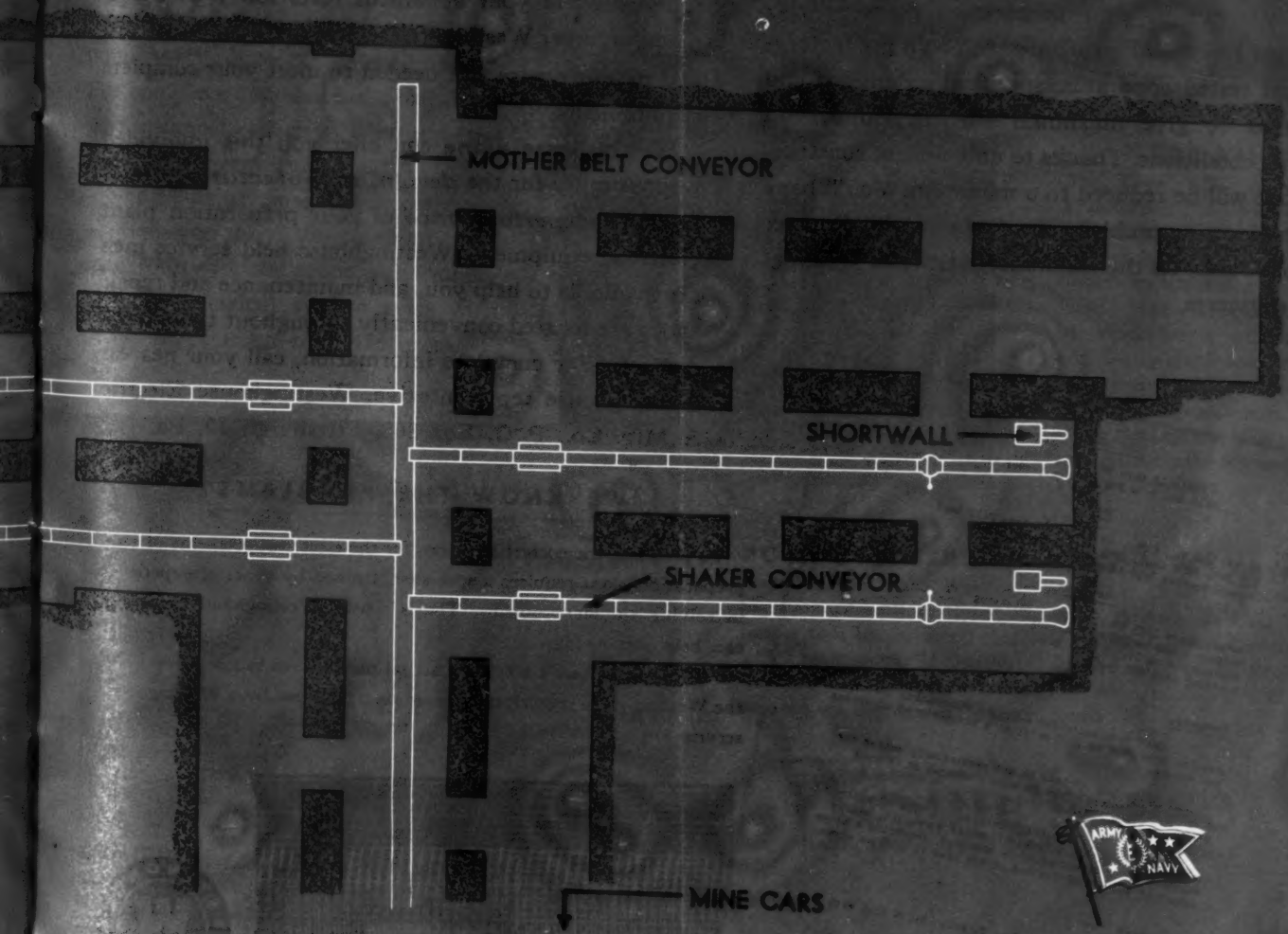
GOODMAN MANUFACTURING COMPANY

CONVEYOR SYSTEM OF MINING

A Continuous Flow of Coal from Face to Mine Car

With Duckbill-Shaker Conveyors entries and rooms are driven rapidly with a marked decrease of roof and ventilation difficulties; combined loading and transporting eliminates the gathering problem; improved labor efficiency results in higher tonnage per man employed.

Retreating rooms with Duckbill-Shaker Conveyors on a 3-entry system. Conveyors discharge directly onto mother belt in middle entry. This plan is one of many in successful operation today. A Goodman Sales Engineer can explain it and others in detail.

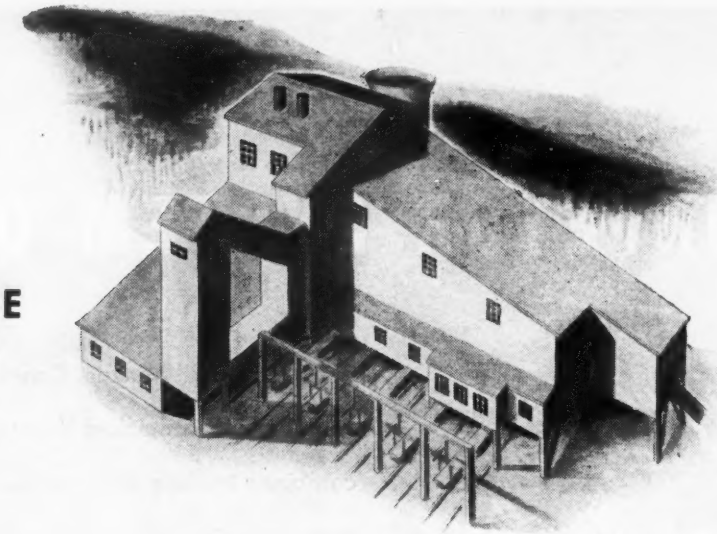


HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

LET

WESTINGHOUSE PRESCRIBE

FOR YOUR

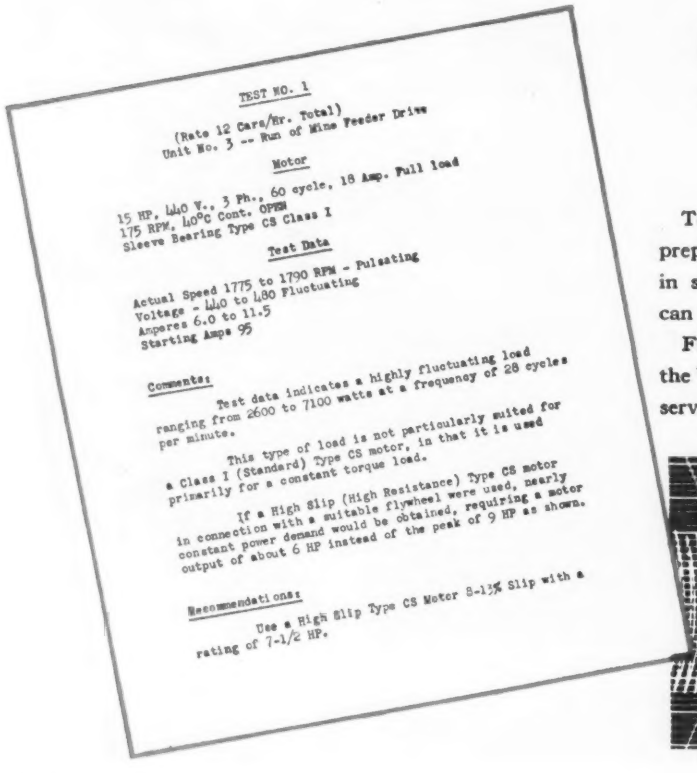


Coal preparation problems

Here's a dependable prescription for a healthy efficiency curve in your preparation plant—*Westinghouse electrical equipment*. You'll get factory-built and tested apparatus, specifically designed and engineered to give maximum efficiency under all operating conditions. Thanks to unit design, construction work will be reduced to a minimum. You'll have fewer engineering problems, too—the result of proper selection, based on the recommendations of Westinghouse engineers.

Equally important—responsibility for the proper functioning of your apparatus rests solely with *one* manufacturer. Westinghouse builds *all* the electrical and motive equipment needed to meet your complete requirements.

Westinghouse *alone* can offer you this undivided responsibility for the *design, manufacture, installation* and *performance* of your preparation plant electrical equipment. Westinghouse field service men are available to help you, and maintenance and repair shops are located conveniently throughout the mining districts. For complete information, call your nearest Westinghouse representative. Westinghouse Electric & Mfg. Co., P. O. Box 868, Pittsburgh 30, Pa.



TEST NO. 1

(Rate 12 Cars/Hr. Total)
Unit No. 3 -- Run of Mine Feeder Drive

Motor

15 HP, 440 V., 3 Ph., 60 cycle, 18 Amp. Full load
175 RPM, 40°C Cont. OPEN
Sleeve Bearing Type CS Class I

Test Data

Actual Speed 1775 to 1790 RPM - Pulsating
Voltage - 440 to 480 Fluctuating
Amperes 6.0 to 11.5
Starting Amps 95

Comments:

Test data indicates a highly fluctuating load ranging from 2600 to 7100 watts at a frequency of 28 cycles per minute.

This type of load is not particularly suited for a Class I (Standard) Type CS motor, in that it is used primarily for a constant torque load.

If a High Slip (High Resistance) Type CS motor in connection with a suitable flywheel were used, nearly constant power demand would be obtained, requiring a motor output of about 6 HP instead of the peak of 9 HP as shown.

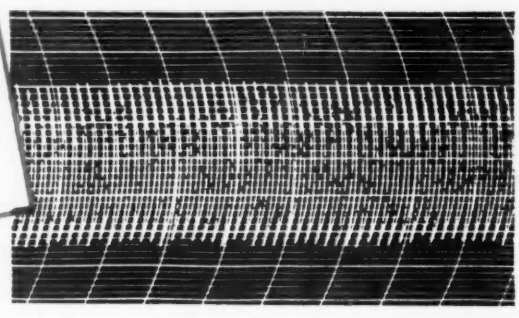
Recommendations:

Use a High Slip Type CS Motor 8-12% Slip with a rating of 7-1/2 HP.

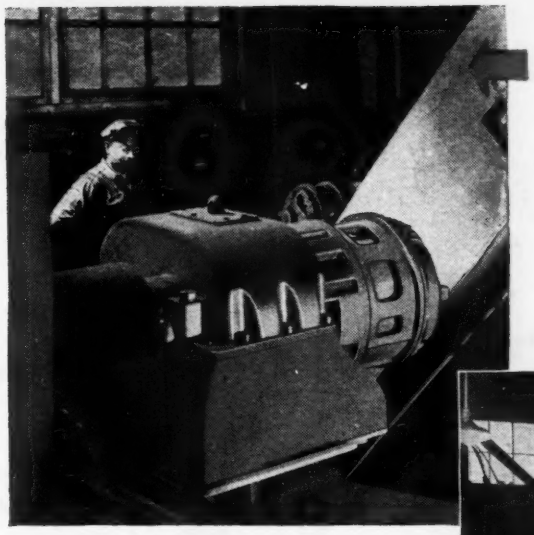
WE KNOW THE PROBLEMS

To prescribe the correct solutions for the electrical problems of each preparation plant requires a specialist, trained by years of experience in solving similar problems. That's where Westinghouse engineers can help you.

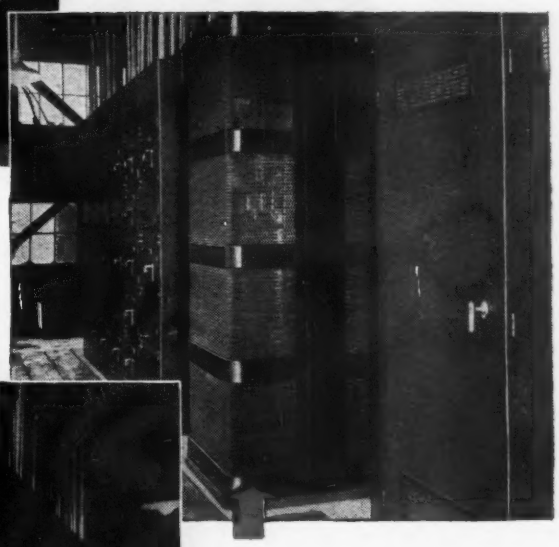
For example, here's a typical actual problem—a motor drive—and the Westinghouse prescription, based on a field test by a Westinghouse service engineer.



WESTINGHOUSE



MOTORS AND GEARMOTORS
Selection of the correct type and size for each individual function is important to successful over-all production. There's a Westinghouse motor and gearmotor to fit every application —and each conforms to the rigid Westinghouse specifications.



HERE ARE THE ANSWERS

The electrical apparatus in your coal preparation plant is important. Upon it depends the efficient, economical operation of the entire plant. For complete assurance of dependable performance, specify Westinghouse for *all* your requirements.

The Westinghouse line is complete —when you buy Westinghouse, responsibility for the proper functioning of your electrical system rests with *one experienced* manufacturer.

TRANSFORMERS—The Type ASL Air-Cooled Transformer is particularly recommended for use in coal preparation plants. It is free of hazard to apparatus or workmen; no vault is required. Danger from fire or explosion is completely eliminated; no liquids of any kind are used. Air cooling by natural-draft circulation through the housing and coils insulates the low and high-voltage windings.

POWER CENTERS—Mounted in one complete factory-assembled unit, the Westinghouse Power Center consists of a high-voltage section, throat-connected through an ASL Transformer to a similar metal-clad, low-voltage Control Center, from which point power is distributed for the entire plant. Economy, safety, compactness and ease of installation, operation and maintenance are distinguishing characteristics. J-94644

CONTROLS—Localizing of controls for the entire plant in a single, conveniently located push-button control station is an outstanding Westinghouse development for greater plant efficiency and safety. All push-button stations, indicating lights and transfer switches, are mounted on the front panel of a completely metal-clad enclosure. Vertical construction entirely eliminates the dust hazard always present with bench-type or angle mountings.

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Electrical Equipment for the Mining Industry

LIKE A CHAMPION SKIER . . .

FORM-SET ROPE IS *relaxed*

He races down the hillside, quickly gathering speed. Almost nonchalantly, the skier does his turn at a breakneck pace as plumes of feathered snow swirl up and away. He's graceful, effortless, sure . . . because he's *relaxed.*

There's a great deal of that same relaxed quality in Form-Set rope. Form-Set is Bethlehem's preformed, and wire rope in the preformed construction has been relieved of many internal stresses and strains; freed of the locked-in tension that sometimes shortens rope life.

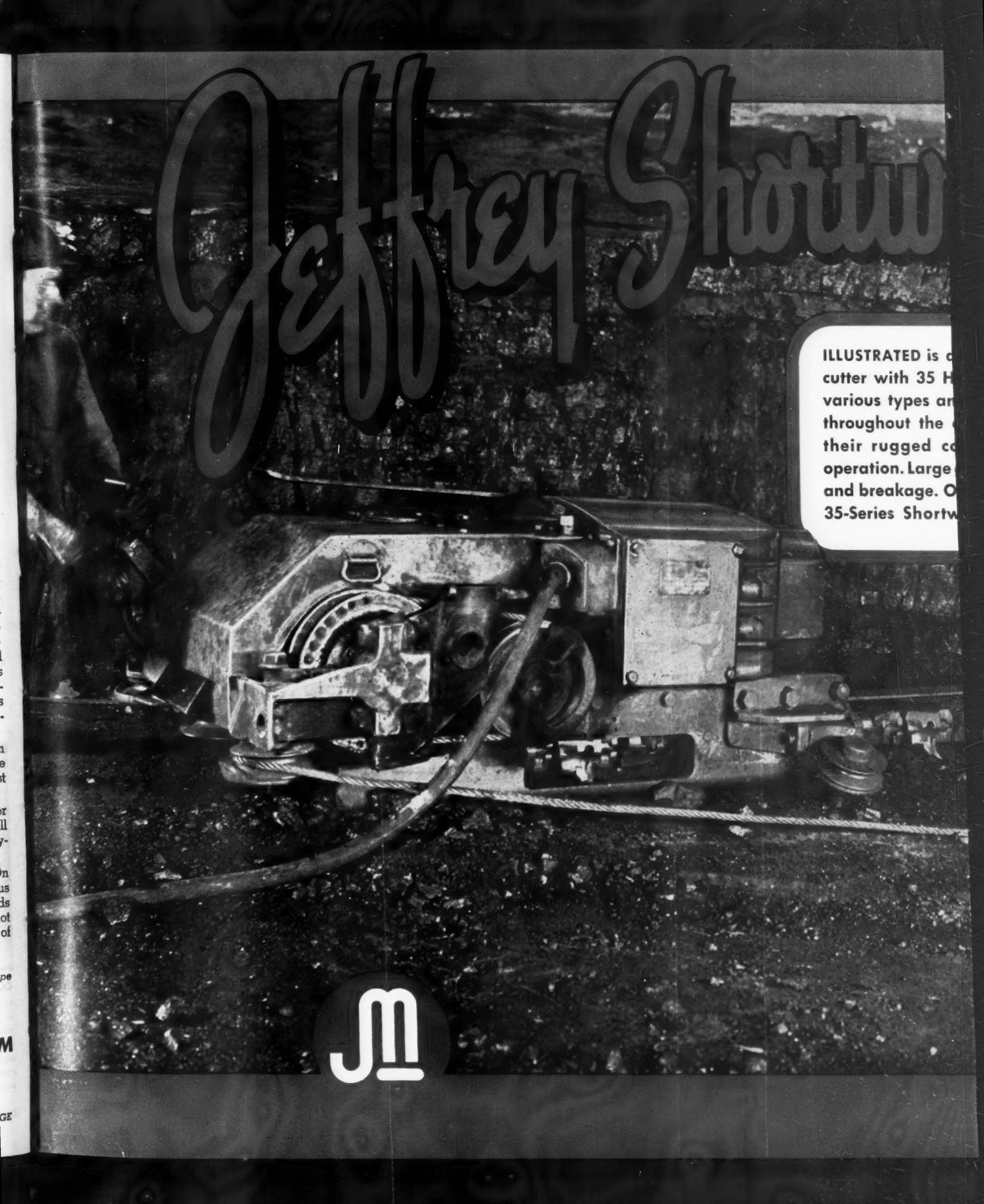
The helical wires don't have a nervous urge to straighten themselves out. Cut a section of Form-Set rope and see what happens. *Nothing.* The wires and strands lie just as they were. They don't pop loose or "wicker."

What's all this add up to? First, longer life (savings for *you*). Second, easy handling (something your *crews* will like). Third, better performance (and that's what everybody wants).

There's real dollar value in Bethlehem Form-Set. On scores of applications subjecting the lines to serious bending fatigue, the preforming process actually adds rope life. This saves you money in the long run. Why not prove it to your own satisfaction with a trial length of Form-Set*—the rope that's *relaxed?*

**All grades, constructions, and sizes of Bethlehem Wire Rope can be supplied with the Form-Set feature.*

When you think WIRE ROPE . . . think BETHLEHEM


Jeffrey Shortw
ILLUSTRATED is
cutter with 35 H
various types ar
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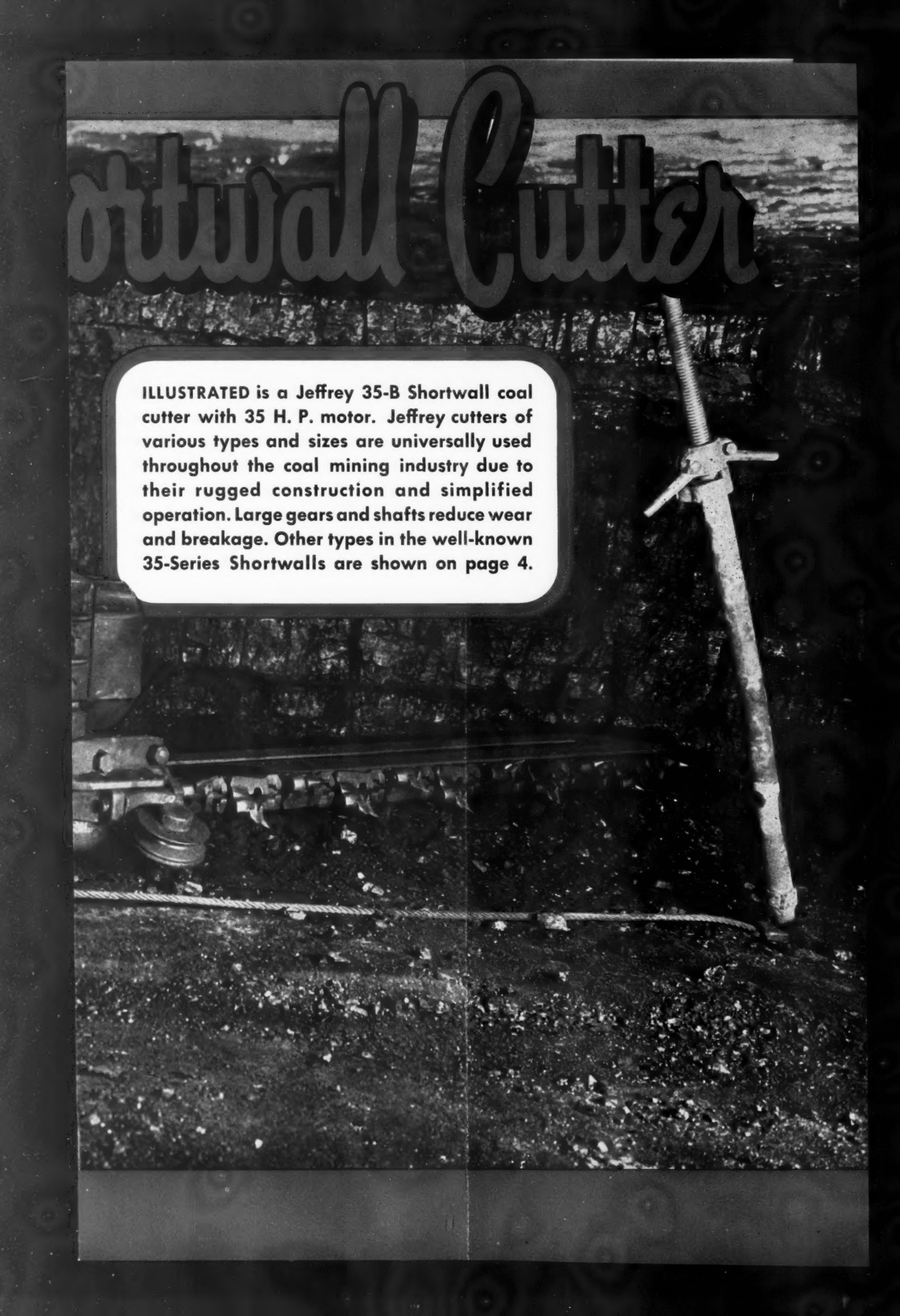
operation. Large
and breakage. O
35-Series Shortw



ILLUSTRATED is a Jeffrey 35-B Shortwall coal cutter with 35 H. P. motor. Jeffrey cutters of various types and sizes are universally used throughout the coal mining industry due to their rugged construction and simplified operation. Large gears and shafts reduce wear and breakage. Other types in the well-known 35-Series Shortwalls are shown on page 4.

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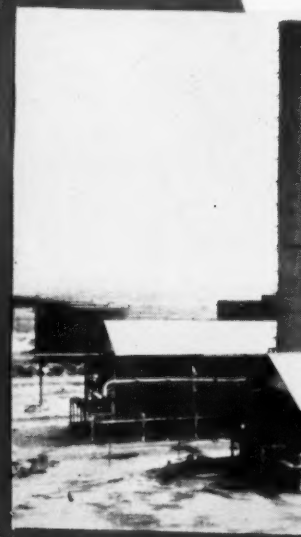
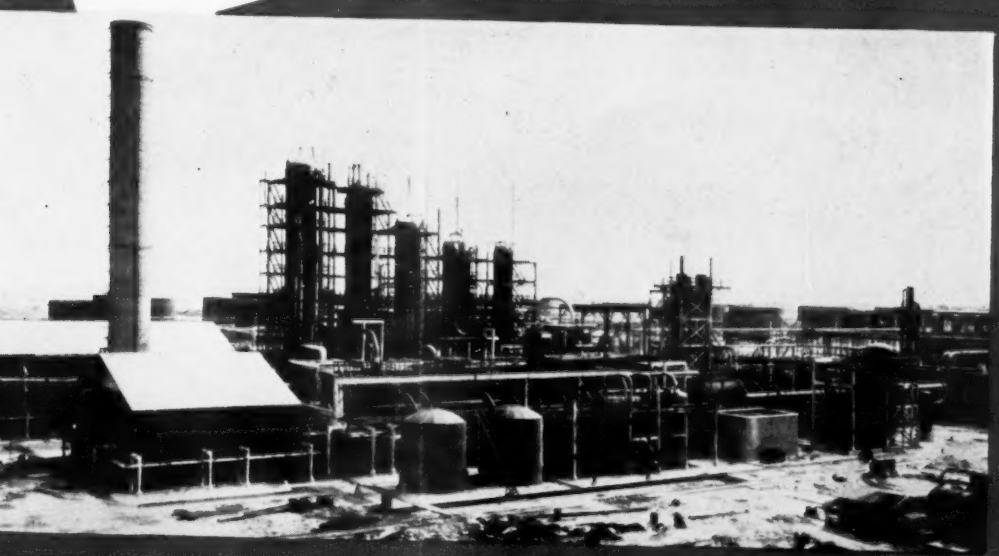


The Chemical Industry uses enormous quantities of Coal

The by-products of about 100,000,000 tons of coal are used annually by this industry.

JEFFREY with its broad line of mechanical mining and preparation equipment—for operations above or below ground—is doing a major job of producing coal for this vital industry.



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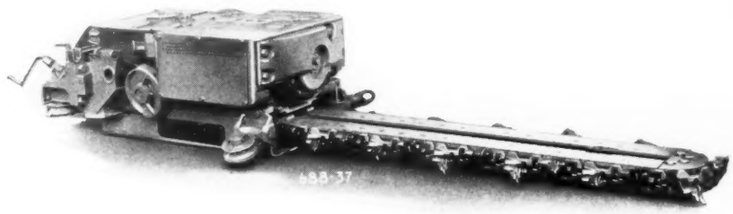
Jeffrey SHORTWALL CUTTERS

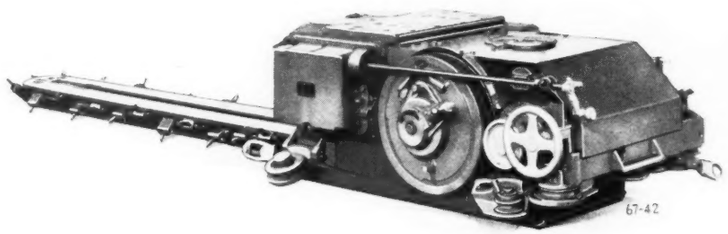
JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY

JEFFREY EQUIPMENT FOR COAL MINES

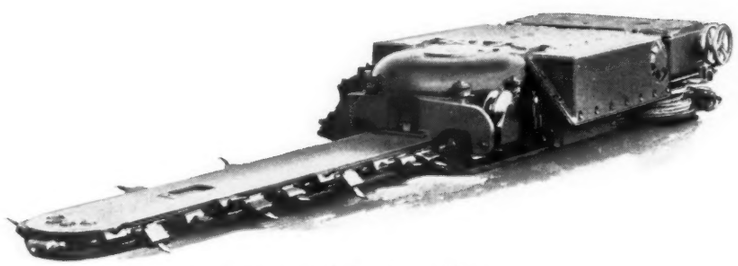
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



Types 35-20, 35-BC and 35-BCS for Conveyor Mining



Type 35-BB for Continuous Cutting



Type 35-L for Low Veins

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake City
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.	Scranton	
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England	Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.		

THEY EVEN SURVIVE WRECKS

Edison Alkaline Batteries in mine locomotives and shuttle cars have survived so many wrecks with little or no damage — and then have gone on to deliver full service life — that maintenance men no longer are apt to get excited when they see damaged trays of cells come into the shop.

They usually just test, reassemble, and send out again. They *expect* them to stand up simply because they have seen them do it so often, and have learned that the steel cell construction of alkaline batteries has no equal for rugged strength.

Yet their durable mechanical construction is only one of a number of reasons why alkaline batteries are dependable, economical power units. They can be fully charged in 6 to 7 hours direct from the d-c. power supply; do not require critical rate regulation; give longer life than any other type of battery; can be laid up indefinitely without injury; can be ventilated rapidly for high-temperature operation, yet are not damaged by freezing.

Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.

LOCOMOTIVE FALLS 170 FEET;
BATTERY STILL TESTS O. K.

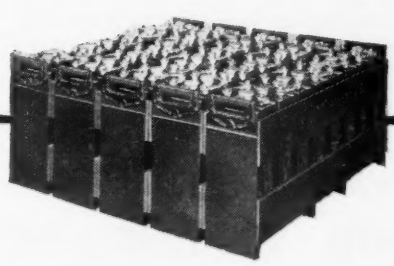
A worker was unloading steel near the top of a mine shaft. A trammer was in the way. He did not know how to move it but he saw the controller handle and shoved it on.

The trammer headed for the shaft, smashed through the gate, fell down the shaft, and stopped just above the 200 level, a drop of 170 feet.

The alkaline battery in the trammer required a few external repairs but all the cells tested O. K. so it was returned to service. It was then five years old. It later delivered an additional eight years of service.

The fact that alkaline batteries can withstand such accidents, illustrates the extra dependability that they deliver under more normal conditions.

TYPICAL 40-CELL BATTERY FOR SMALL TRAMMER



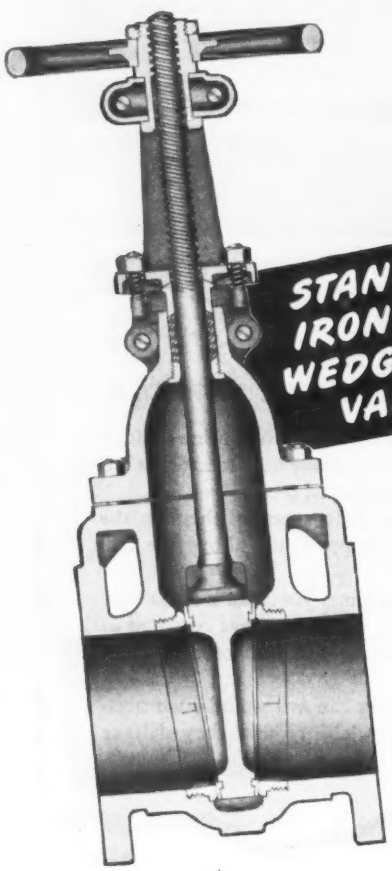
Edison
ALKALINE BATTERIES

DEPEND ON CRANE . . . WHEN IT'S PIPING EQUIPMENT YOU NEED

ONE SOURCE OF SUPPLY • ONE RESPONSIBILITY FOR ALL PARTS • ONE STANDARD OF QUALITY

To keep piping at its best, to simplify and speed up deferred replacements—call on the Crane line. You choose from the world's greatest selection of piping materials—in brass, iron and steel. One source—your Crane Branch or Wholesaler—supplies on one order all your requirements. Every part is uniform in quality, backed by a single responsibility. Your whole task from ordering of parts to installing them is simplified—and at the same time you are benefiting by Crane Co.'s 90-year leadership in the field of piping materials. Below is an example of Crane complete lines—in Standard Iron Body Wedge Gate Valves.

Boiler control system for regulating dampers



SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-rising Stem patterns.

Working Pressures

Size of Valve	Screwed or flanged end valves		Hub end valves
	Saturated Steam	Cold water, oil or gas, non-shock	Cold water or gas, non-shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 & 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150 pound Cast Steel Gate Valves are recommended. (For sizes under 2 in., use Crane Clamp Gate Valves.)

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE

90 YEARS OF PROGRESS 1855 1945

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

O-B TYPE L TROLLEY SHOES *Can't Tilt* BECAUSE THEY RIDE THE TROLLEY WIRE ON *Dead Center*

1 Minimizes Arcing and Wire Burning

2 Promotes Longer Wire and Collector Life

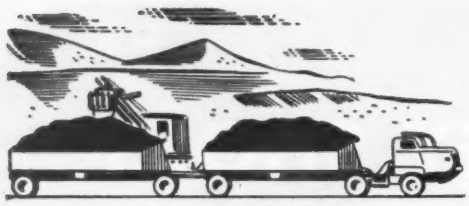
3 Permits Smooth Gliding over Bumps and Hard Spots

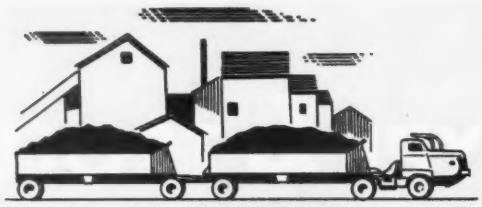
A patented arrangement whereby the center of bearing oscillation falls on the line of contact between shoe and wire. For a more complete discussion of this bearing, see O-B Haulage Ways, December 1944 issue.

Ohio Brass MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT

2556 M





One Fill– ***One Dump–*** ***One Driver–***

DELIVERS 60 TONS EACH TRIP!

Larger pits—longer runs to the tipple—limited manpower . . . yet still bigger coal quotas must be met. How can you do it?

High-tonnage hauling with Walter Tractor Trucks is the answer! Make every trip deliver more tons—and use fewer hauling units to do it. Haul 60 tons in two trailer units; 30 tons in single trailers, at speeds equalling smaller trucks. With fewer trucks to man, fewer trucks to service—and greater tonnage delivered, your hauling cost per ton is considerably lower.

At the same time, these huge loads are easily handled and maneuvered by the driver, while smooth tractive power reduces wear on road and tires.

WALTER TRACTOR TRUCKS

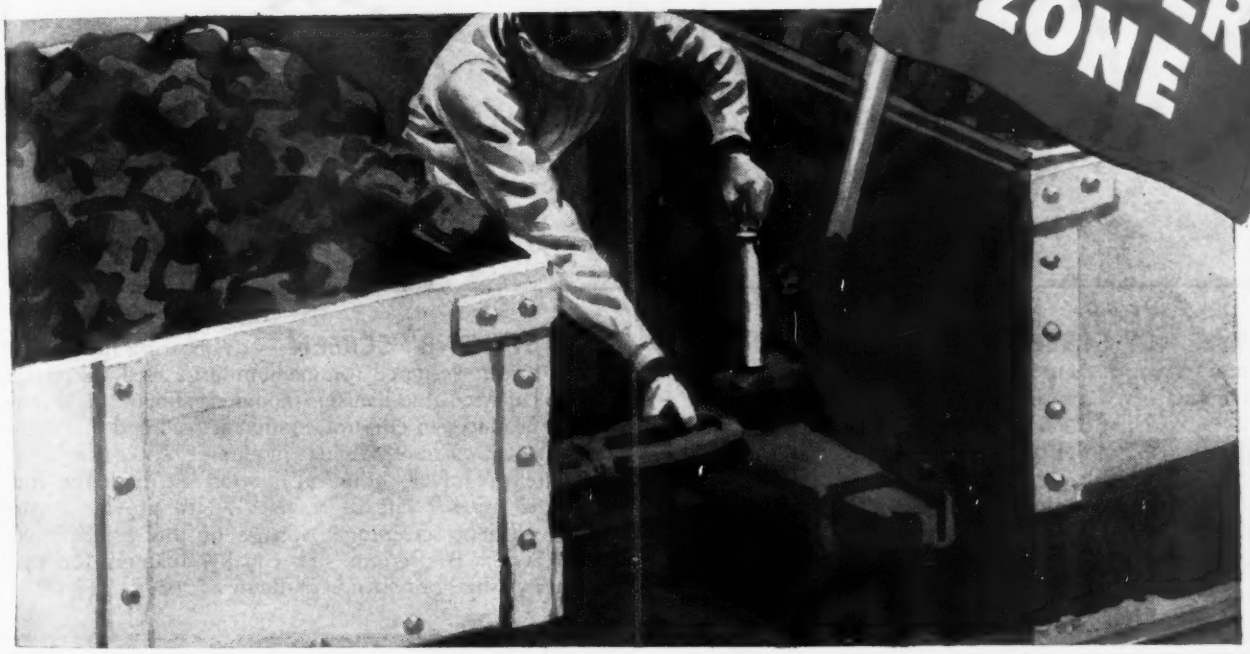
Walter Tractor Trucks are designed throughout for strip mine hauling. Tremendous power and traction are obtained from the 300 h.p. Butane engine, through the Walter 4-Point Positive Drive System. Three automatic locking differentials proportion the power to the FOUR driving wheels according to the traction of each at any moment. There is no wheel spinning on soft dirt, mud, loose coal, steep grades or slippery surfaces.

Adding ruggedness and easy, safe handling are the suspended double reduction drive, tractor type transmission, hydraulic steering, air brakes, cab forward design for short wheel base and scientifically distributed weight. No other truck has all these features. Write for detailed literature today.

WALTER MOTOR TRUCK CO. 1001-19 Irving Ave. Ridgewood 27, Queens, L.I.N.Y.

WHY TAKE CHANCES WITH OTHER MEN'S LIVES?

Keep Your Workmen Out of the



WITH O-B AUTOMATIC MINE CAR COUPLERS

One out of every five haulage accidents may be attributed to coupling. You can help eliminate the cause of this fifth accident by keeping your workmen out of the "danger zone" that exists between the cars. With O-B Automatic Couplers installed on your cars, workmen need not enter the danger zone to manipulate treacherous link and pin hitchings. Cars couple automatically upon impact. Uncoupling is just as easily accomplished by raising a lever conveniently located on the outside corner of the car.

Take safety into consideration on your next mine car purchase. If you will send us a print of your proposed car, we will be glad to show you how O-B Automatic Couplers can be incorporated in your design.

★ ★ ★

Coupled automatically upon impact, O-B Coupler-equipped cars may be separated by raising a lever located on the outside corner of the car.

Ohio Brass

MANSFIELD, OHIO

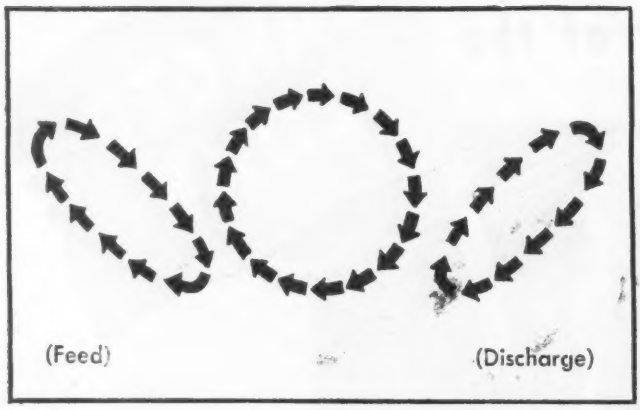
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

KEEP BUYING WAR BONDS

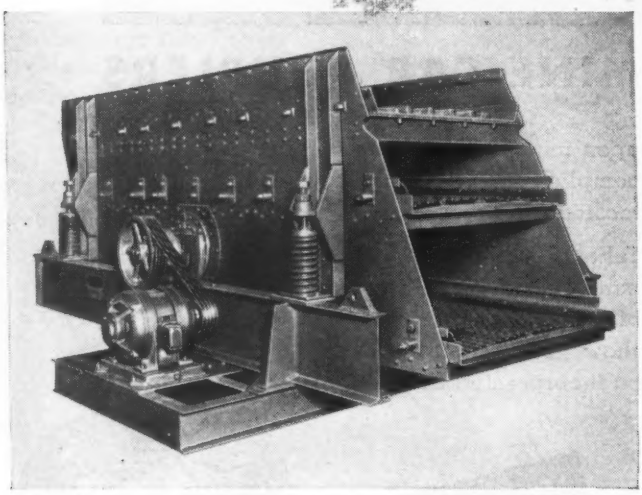
2557 AM

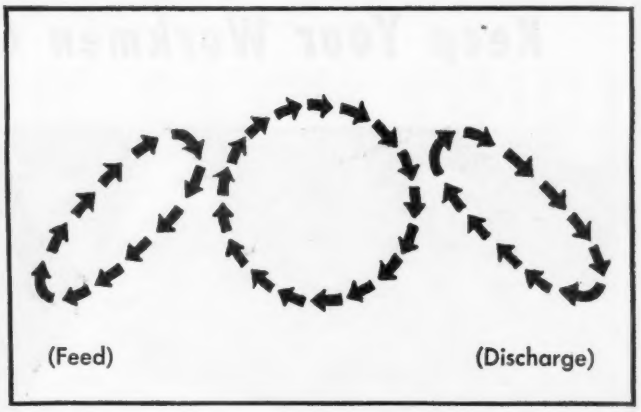
Which Vibrating Screen is

THE BASIC TYPES. ALLIS-CHALMERS

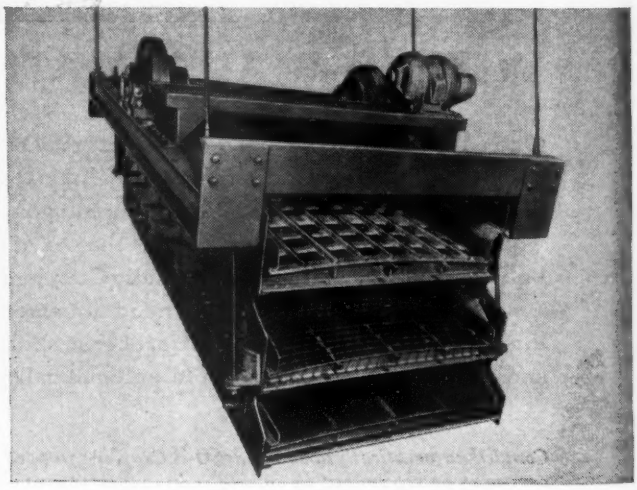


1 STYLE "C" SCREEN — a 4-bearing extra-heavy duty screen designed for large feed. Elliptical motion at feed end tends to *retard* travel of large pieces; circular motion at center *increases* rate of travel; elliptical motion at discharge end *further accelerates* rate of travel — to give you rapid scalping operation. This principle of vibratory motion assures highly efficient separation, especially where feed contains a wide range of particle sizes. Examples: "run of mine ore," quarry material, and pit run material.





2 STYLE "B" SCREEN — a 4-bearing heavy duty screen designed for medium-large feed. Eccentric balanced mechanism mounted above the screen produces an elliptical motion at feed end that starts material at a *rapid rate;* circular motion at center that *slows down* rate of travel; elliptical motion at discharge end that *further retards* rate of travel . . . to provide ample time for efficient screening. Because of this principle of motion, Style "B" screens are equally adapted for wet screening, washing, or sizing. Bulletin B6005.

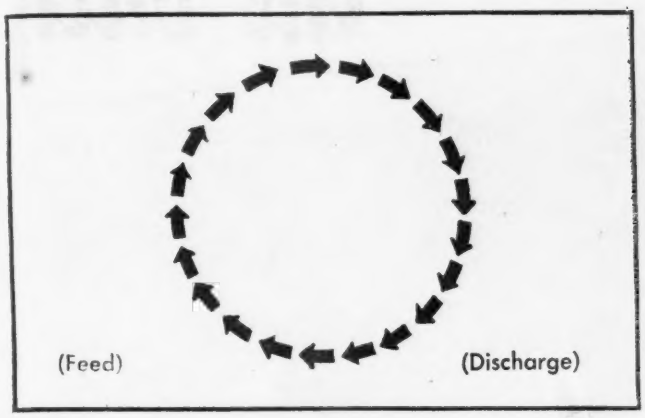


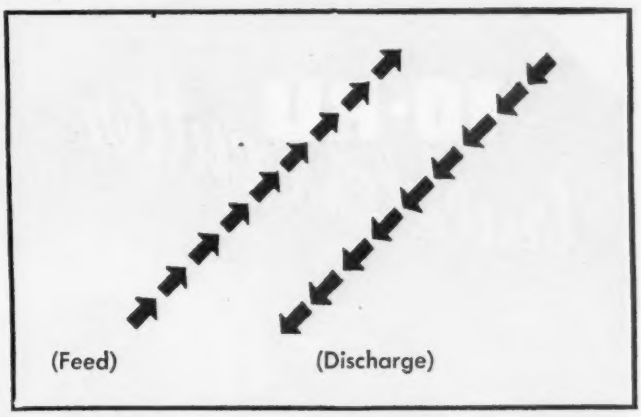
NEXT TIME you have a problem . . . call on Allis-Chalmers. Building one of the world's broadest lines of mining and processing equipment, A-C is in a *unique* posi-

A-C
WE WORK FOR VICTORY
WE PLAN FOR PEACE
BASIC EQUIPMENT FOR COAL INDUSTRIES:
ALLIS
Vibrating Screens, all types for Wet or Dry Separation
Electric Motors, Control, Texrope V-Belt Drives

the Best for You? HERE ARE 4 OF

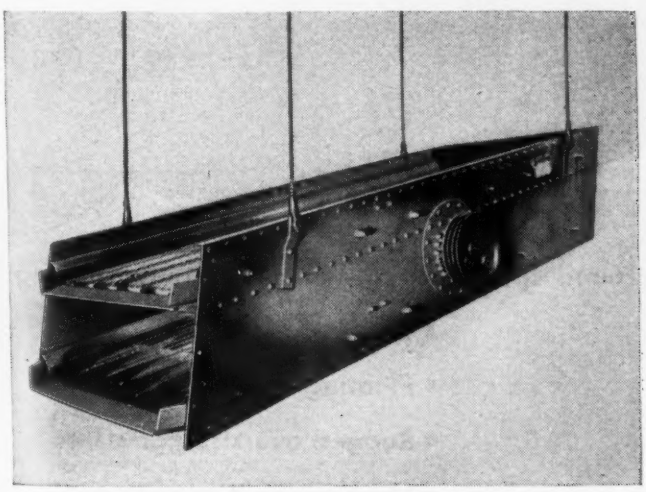
OFFERS YOU A CHOICE FROM ALL 4 . . .

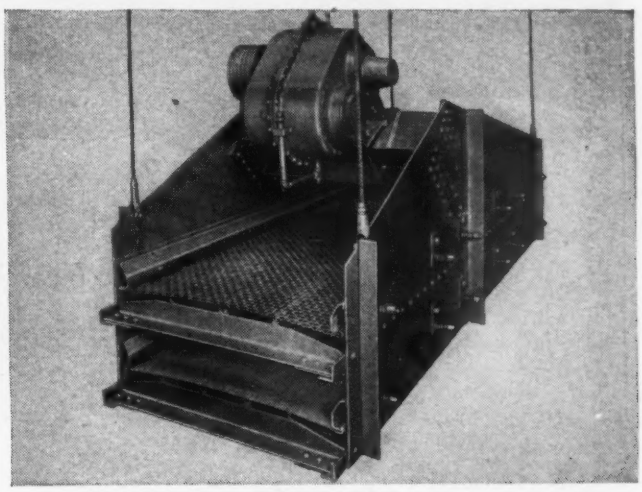




3 RIPL-FLO SCREEN — a 2-bearing screen designed for moderate to heavy duty, fine to coarse screening. A circular vibratory motion *at all points* on screen surfaces is produced by an eccentric shaft and balanced mechanism. Eliminating 2 outer bearings and stationary support frame, the Ripl-Flo screen is *warranted* to perform the same *or better* screening job than conventional 4-bearing screens. Width and weight are also reduced — you save on *lower initial cost* and lower power requirement. Write for Bulletin B6151.

4 LOW-HEAD SCREEN — utilizing a combination of 45° *straight-line* motion and *horizontal* deck operation, the Low-Head screen is ideally suited for wet screening, washing, rinsing or dewatering. Is broadly used in screening of coal, aggregates, metal and non-metallic material, and in "sink-float" operation. And because it is designed for *horizontal* operation, the Low-Head screen saves both headroom and space . . . cuts dollar cost of installation or remodeling. For full particulars, write for Bulletin B6330.





tion to offer you valuable know-how in teaming up screens with other machinery in your plant. Contact our nearby district office, or write ALLIS-CHALMERS, MILWAUKEE. A 1787

Tune in the Boston Symphony, Blue Network, every Sat. Eve.

CHALMERS

Full line of Single & Multi-Stage Centrifugal Pumps

Mine Hoists—with automatic "Regulex" control

Crawler & Wheel-type Tractors, Allied Equipment

Circuit Breakers, Unit-Substations, Rectifiers

ANOTHER SUL

the only

IO-RU *trackless cutter*

- Designed for the job from the ground up!
- Fast, easy hydraulic tramming!
- Dual controls!
- Pneumatic tires!
- Four wheel mounting!
- Two-wheel hydraulic steering!
- Short wheel base!
- Floating rear axle!
- Rugged oversize parts!
- Mechanisms easily accessible!

ARMY E NAVY

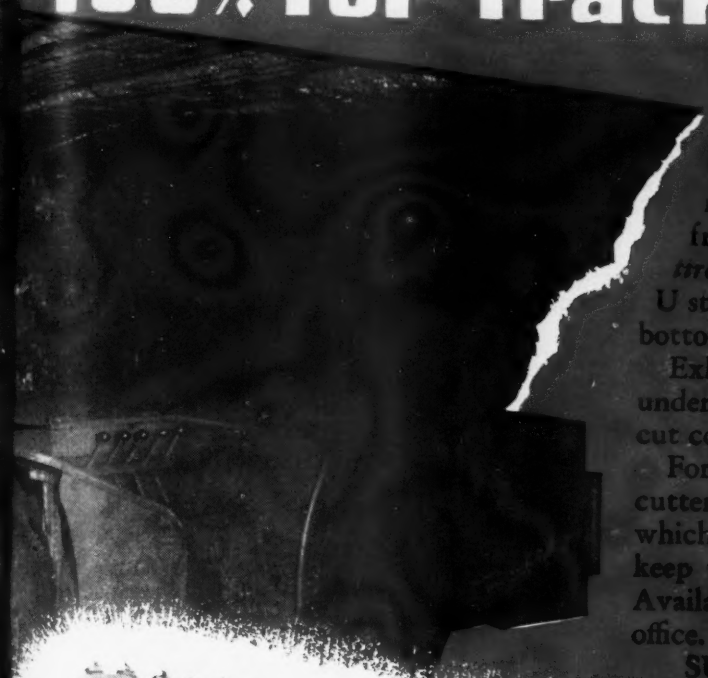
SULL

- a world-wide organization . . . es

LIVAN FIRST..

coal cutter designed...

100% for trackless mining



THE SULLIVAN 10-RU Trackless Coal Cutter is *the only existing cutter designed new from the ground up* to meet the requirements of, and provide greater returns from, trackless mining! R stands for *rubber-tired*—plenty of traction and easy tramming. U stands for *universal*—will top cut, middle cut, bottom cut, center and side shear.

Exhaustively tested in many months' service underground, the 10-RU has proved its ability to cut coal in less time at less cost.

For complete details on this revolutionary new cutter, write for NEW CATALOG No. C-33 which will interest every operator who wants to keep up on advances in coal mining machinery. Available upon request to the nearest Sullivan office.

SULLIVAN MACHINERY COMPANY.
Executive Offices: Michigan City, Ind.
In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.

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Birmingham, Ala.
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Chicago, Ill.
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SULLIVAN PRODUCTS

Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists
Car Pullers • Air Compressors • Coal Drills • Rock Drills • Cutter
Bit Sharpeners and Heaters • Core Drills and Contract Core Drilling

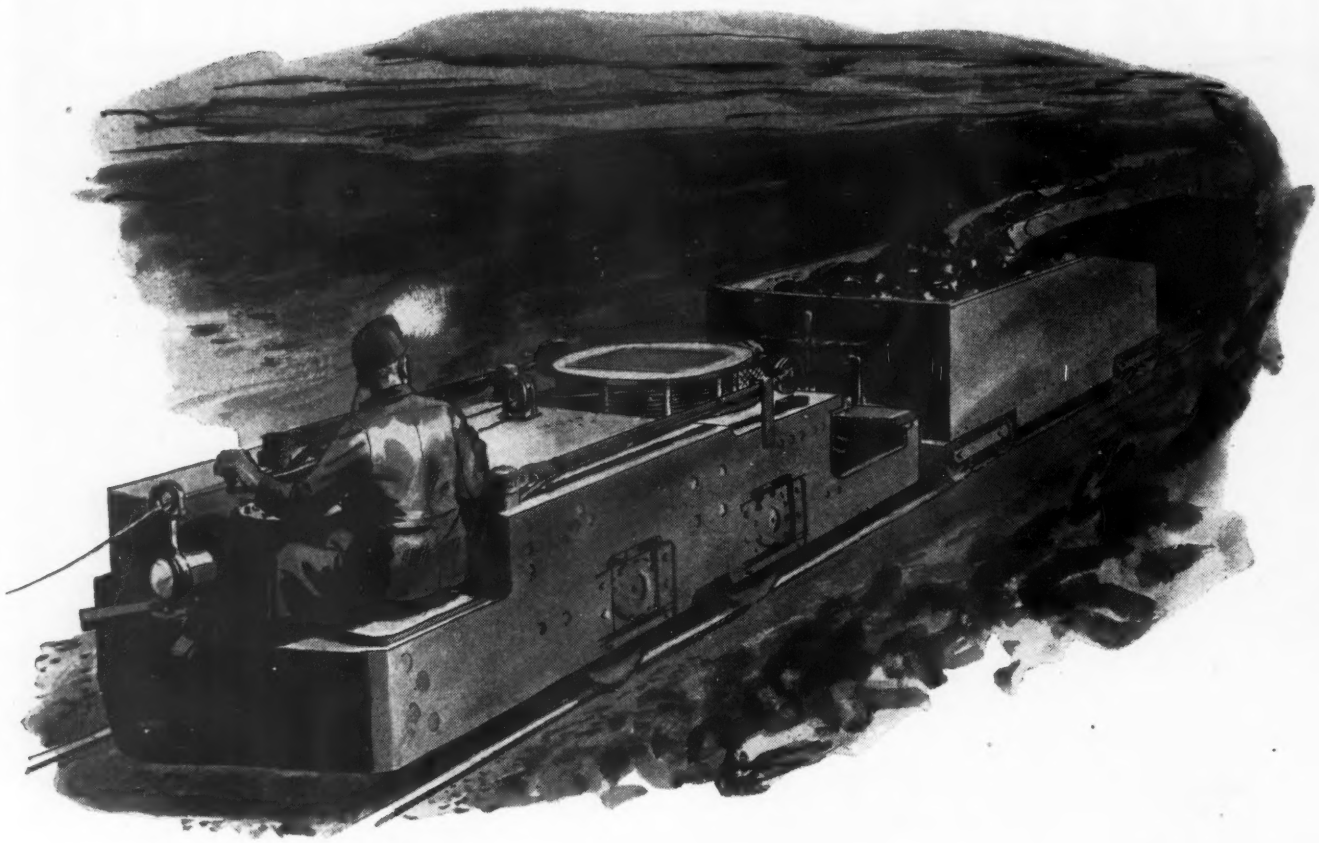
Licensed Under the Patents to E. C. Morgan Nos. 1706961, 1706962, 1707132, and 1953325.

SULLIVAN TRACKLESS UNIVERSAL 10-RU COAL CUTTER

SULLIVAN

...established 1851 -

Westinghouse Introduces



The new Westinghouse "DUAL-DUTY" mine locomotive performs all tractive service from the face to the main haulage siding.

When the locomotive is operating behind the loading machine from reel, low speed is necessary due to the short length of each movement, and because it is operating on temporary tracks. Under this condition, the motors operate at maximum field strength to develop maximum tractive effort at low speed, and with minimum power consumption.

When operating from trolley on more permanent tracks, in secondary haulage service, the motor fields' strength may be changed to obtain an increase in speed of approximately 40%, thus enabling the locomotive to make the longer movements at an economical speed.

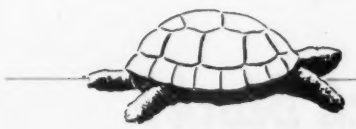
For the first time, a locomotive has been developed which will do both of these jobs efficiently. Selection of speeds is provided by extra controller "points".

Call your nearest Westinghouse office for full details—or write Westinghouse Elec. & Manufacturing Co., P. O. Box 868, Pittsburgh 30, Pa. J-15098

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

THE "DUAL-DUTY" MINE LOCOMOTIVE



low speed for gathering

high speed for secondary haulage

Prior to the introduction of Westinghouse "DUAL-DUTY" mine locomotives, the industry had to choose between four types of equipment:

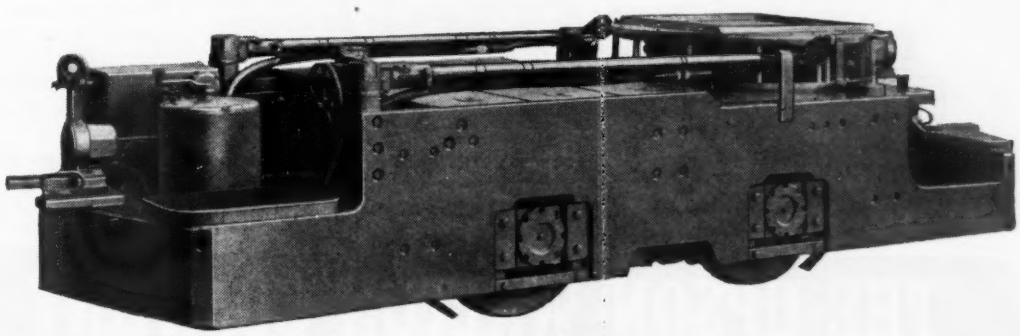
1. Entirely different locomotives, with entirely different speeds, for gathering and swing service.
2. Series parallel connections, to obtain different operating speeds.
3. High-speed locomotives, operating on points when used in gathering service.
4. Low-speed locomotive designed primarily for gathering, but too slow for efficient secondary haulage.

The new Westinghouse "DUAL-DUTY" mine locomotive eliminates all of the recognized disadvantages of the four old systems.

The "DUAL-DUTY" locomotive with its motors always connected in parallel has smoother operating characteristics and hauls heavier loads—operates equally efficient at high or low speeds, with minimum power demand. *It's another Westinghouse "first" for mechanized mines.*

OTHER WESTINGHOUSE MINE LOCOMOTIVE "FIRSTS"

- Breather—to eliminate formation of destructive acids inside explosion-tested control compartments.
- Parallel Reversing Controller—for simplified control of locomotive in following loaders.
- Cam Type Controller—replaced sliding contact controls with high capacity cam switches.
- Lever Hand Brake—eliminated bothersome hand wheel braking.
- Gathering Reel for Top Inspection—made motor commutator, slip ring and all brushholders easily accessible through openings on the top of the motor frame.
- Easy Journal Bearing Adjustment—by use of journal boxes that may be removed without untrucking locomotive.



MINE LOCOMOTIVES

WESTINGHOUSE

What makes this Upson-Walton Wire Rope Snatch Block a Better Snatch Block?

HERE'S a safety-locking block . . . designed by Upson-Walton engineers . . . tested in actual use by leading contractors in this country and abroad—a *better* block and a *better* buy. Here's why:

EXTRA HEAVY ONE-PIECE STRAP with specially upset and forged eyes for link connections. An exclusive Upson-Walton process—a stronger strap. In addition, bending stresses in the pin are reduced because link spread design is narrower and a shorter pin can be used.

HEAVY STEEL SHELL PLATES with impressed guard to prevent rope from jamming between shell and sheave. Shell plates and strap riveted securely together.

EXTRA HEAVY CROSS HEADS, swivel links, safety links and pins.

DROP-FORGED HOIST HOOK CONNECTION made from specially selected fine grain steels for added strength and safety.

COLD ROLLED STEEL CENTER PINS and close tolerances between sheave bearing and pin result in longer life for the bearing—and the block.

HEAVY RIM AND TREAD SECTIONS IN SHEAVES provide greater resistance to rope wear.

AVAILABLE IN COMPLETE RANGE OF SIZES for various wire rope diameters.

U-W

ESTABLISHED 1871

As we go to Press, Deliveries on most sizes of Upson-Walton Snatch Blocks are good.

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 · 737 West Jackson Boulevard, Chicago 6 · 241 Oliver Building, Pittsburgh 22

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

for

GREATER REALIZATION

Cardox increases realization, especially in fully mechanized mines. Its distinctive slow spreading and shearing action breaks the face along its natural lines of cleavage, rolls the coal forward for quick, easy loading, and largely eliminates shatter-cracks.

Cardox mined coal does not crumble even though subjected to extensive mechanical handling. Consequently it is more economical to clean. In many mines a substantial percentage of impurities are kept so large that they can be picked out of the face by hand . . . making it unnecessary to haul them to the surface.

Other Cardox advantages in mechanized mines include (1) the use of longer cutter bars and more coal per face for the loading machine, (2) reduction of roof and rib failures, (3) elimination of work-retarding smoke and noxious fumes, (4) less wear and tear on loaders.

Write for details of free demonstration of these CARDOX advantages . . . right in your mine.

CARDOX CORPORATION

BELL BUILDING • CHICAGO 1, ILLINOIS

LESS SHATTERING OF IMPURITIES REDUCES CLEANING COSTS

ROLLS COAL FORWARD FOR EASIER LOADING

FIRMER COAL STRUCTURE WITHSTANDS MECHANICAL HANDLING

CARDOX Hardsocg Drilling Equipment

Complete Line of Drilling Equipment designed to give you the maximum in drilling efficiency.

EVERYTHING HAPPENS TO AMERCLAD

Other U·S·S American Electrical Products for mine use:

- Tigerweld Rail Bonds
- PS (Conducting Rubber) Shielded Cable
- Bore Hole Cable
- Amerclad Shovel Cable
- Ampyrol Resin-insulated Cable

USS STEEL
UNITED STATES STEEL

BUT NOTHING *breaks it down!*

DRAG it over sharp rocks. Haul it through mud, grease and water. Step on it, kick it —Amerclad will show you what stamina and endurance can be built into a cable.

Designed to survive under all kinds of abuse, Amerclad maintains an uninterrupted flow of power to meet increased wartime demands.

Low-voltage Amerclad Cables are flexible to permit continual reeling and unreeling. Their resistance to water, acids and oils assures long life and freedom from maintenance. They will operate satisfactorily at heavy overloads and high temperatures.

High-voltage Amerclad Cables provide high-impulse strength plus flexibility without danger of corona cutting so that continuity of service is assured.

In Amerclad, American Steel & Wire Company engineers have combined physical and chemical properties in the most advantageous manner. New synthetic rubber compounds have been developed which, in many cases, offer properties superior to natural rubber.

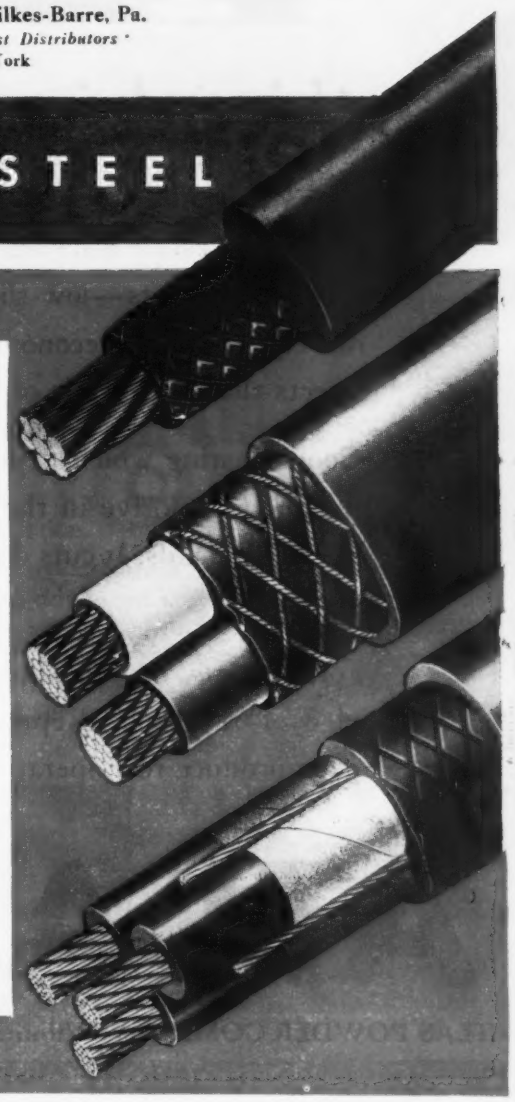
Next time you need cable, use Amerclad. It saves time and money. Write for our booklet, "Amerclad Cords and Cables."

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

For Anthracite Service: Miners Bank Building, Wilkes-Barre, Pa.
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL



Amerclad Single-Conductor Locomotive Gathering Cables. Flexible for gathering-reel type but suitable for any purpose where cable must withstand hard knocks, acid waters and high temperature operation. Voltage 0-600; 601-1000.

Amerclad Twin Parallel Mining Cables. Lighter in weight than two-conductor round cables of the twisted type and occupy less space on the drum. Easy to splice. Heavy insulation between conductors affords greater protection against impact or crushing weight. Voltage 0-600; 601-1000.

Amerclad Portable Power Cable Three-Conductor—Type G, PS.* For voltages up to 4500. Ground wires in valleys between conductors plus PS shielding provide protection to workmen. Easier to splice than metallic shielded cable. Has ample insulation on conductors so that it is not dependent on outside jacket for insulating value.

**PS—Conducting Rubber Shielding*

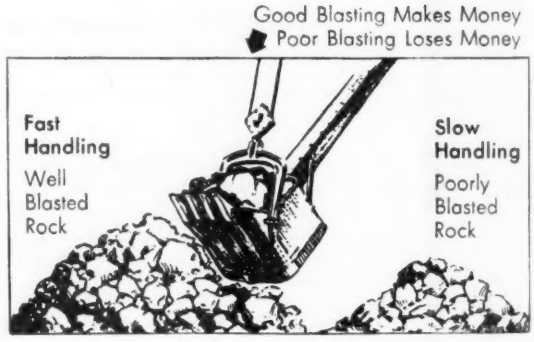
Don't Save at the Spigot and Lose at the Bung

...this advice applies to blasting, too

Many a blaster has tried to "save at the spigot" by cutting down on explosives. He loses sight of the fact that poor breakage means really high costs—low shovel output, excessive wear and tear on equipment, uneconomical use of labor—because blasting affects the whole cycle of the operation.

Good blasting which depends on the use of the right explosive in the right way, means full shovel loads. It cuts down delays and idle manhours.

For such *real thrift*, make use of the knowledge of the Atlas Representative. He can often produce real operating economies.



ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

How We Keep A Fast Crowd In Line

Here's a *fast crowd* that doesn't give trouble--not the way P&H builds it!

It's plain to see why the crowding action of P&H Electric Shovels is so much livelier — more responsive and powerful. Conical worm gear drive cuts inertia to a minimum — permits the most compact gearing unit possible. Only very short shafting is required; overhung gearing is eliminated. Every ounce of power from the independent crowd motor flows smoothly to the dipper sticks for *snappier* crowding — *faster* retracting.

P&H engineers increase the advantages of the compact, flood-lubricated gear case design by building it integral with the boom. Welded-in construction adds to boom rigidity and strength, while integral shipper shaft housing prevents bearing movement and torque on the boom. The net result in any open-pit operation is bigger and steadier production.

This faster, more dependable crowd is another example of the advanced engineering and simplified design that mark the new P&H Electric Shovels as the greatest forward step in electric shovel history. Behind them is P&H's 60-year leadership in applying electrical power to the movement of heavy loads.

P&H

ELECTRIC SHOVELS

4540 W. National Avenue
Milwaukee 14, Wisconsin

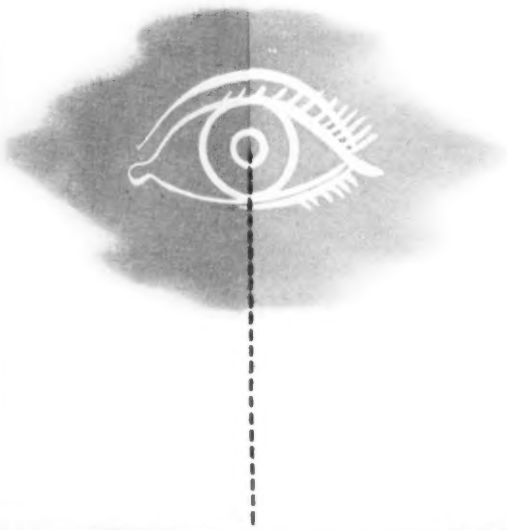
HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

An "EXECUTIVE EYE VIEW"

of a prosperous peacetime coal mine



The executive who views the scene of his coal preparation plant does so with a feeling of accomplishment.

During the war years, he has turned his plant to the preparation of coal for the war. Reconversion will be but a matter of minutes.

There is a waiting market on the postwar horizon. Consumers are truly coal conscious . . . educated to prepared and clean fuel for stoker use, for locomotive, industrial, and domestic purposes.

To look ahead to a continuous and profitable market is doubly gratifying if the mining property was once unpromising . . . transformed by the installation of the preparation plant into a producer of fuel to sell at premium prices.

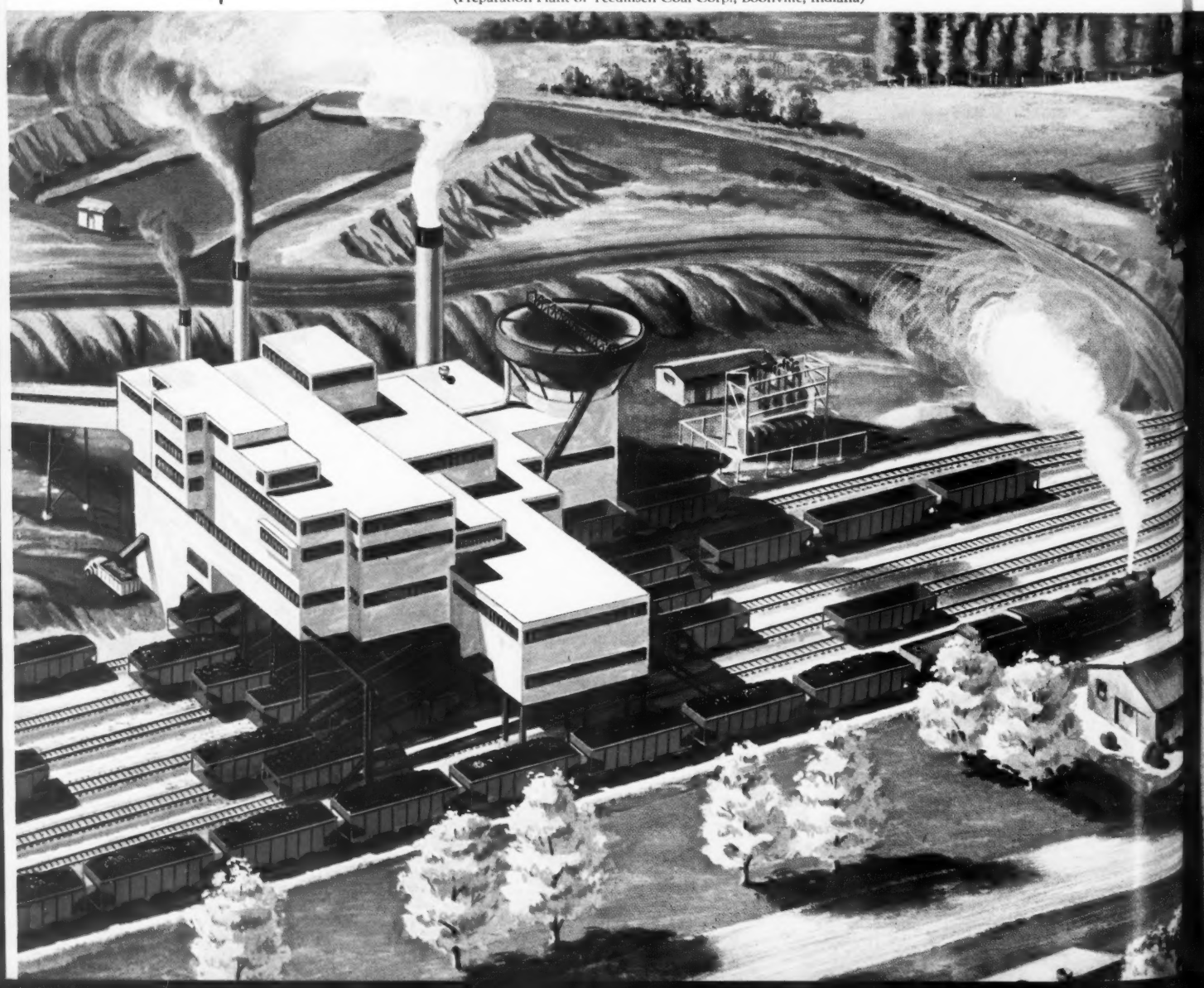
Only laboratory tests can forecast and determine whether coal filled with impurities can become specification coal.

Your executive and operating staffs are invited to confer with our staff on the preparation of coal for peacetime demands. *It is a matter of record that there has never been an unprofitable McNally engineered plant for coal preparation . . . whether it was installed at a strip mine or a deep mine.*

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

(Preparation Plant of Tecumseh Coal Corp., Boonville, Indiana)



PRODUCTION MAN'S DREAM REALIZED
. . . Washed Coal of Predetermined Ash Content

The heart of a coal preparation plant is the washer which removes non-combustible material from raw coal resulting in the absolute maximum of coal recovery.

The McNally-Norton Washer, a compact, impulse washer of the Baum type, with important improvements over the Baum jig principle, starts operation at the touch of a finger on the electric control.

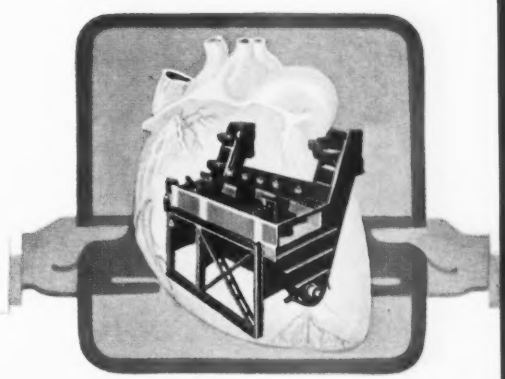
It then proceeds to separate coal and refuse with greatest accuracy, controlling definite ash content hour after hour without attention, regardless of variations of ash in the raw coal feed.

By sliding the control weight on a graduated balance beam, specific gravity of washed coal can be changed at will.

The McNally-Norton quadrant type refuse gate, which cannot jam, makes it possible to wash coal in sizes up to seven inches.

Plants like that illustrated to the left are equipped with a series of washers including compound washers to produce specification fuels.

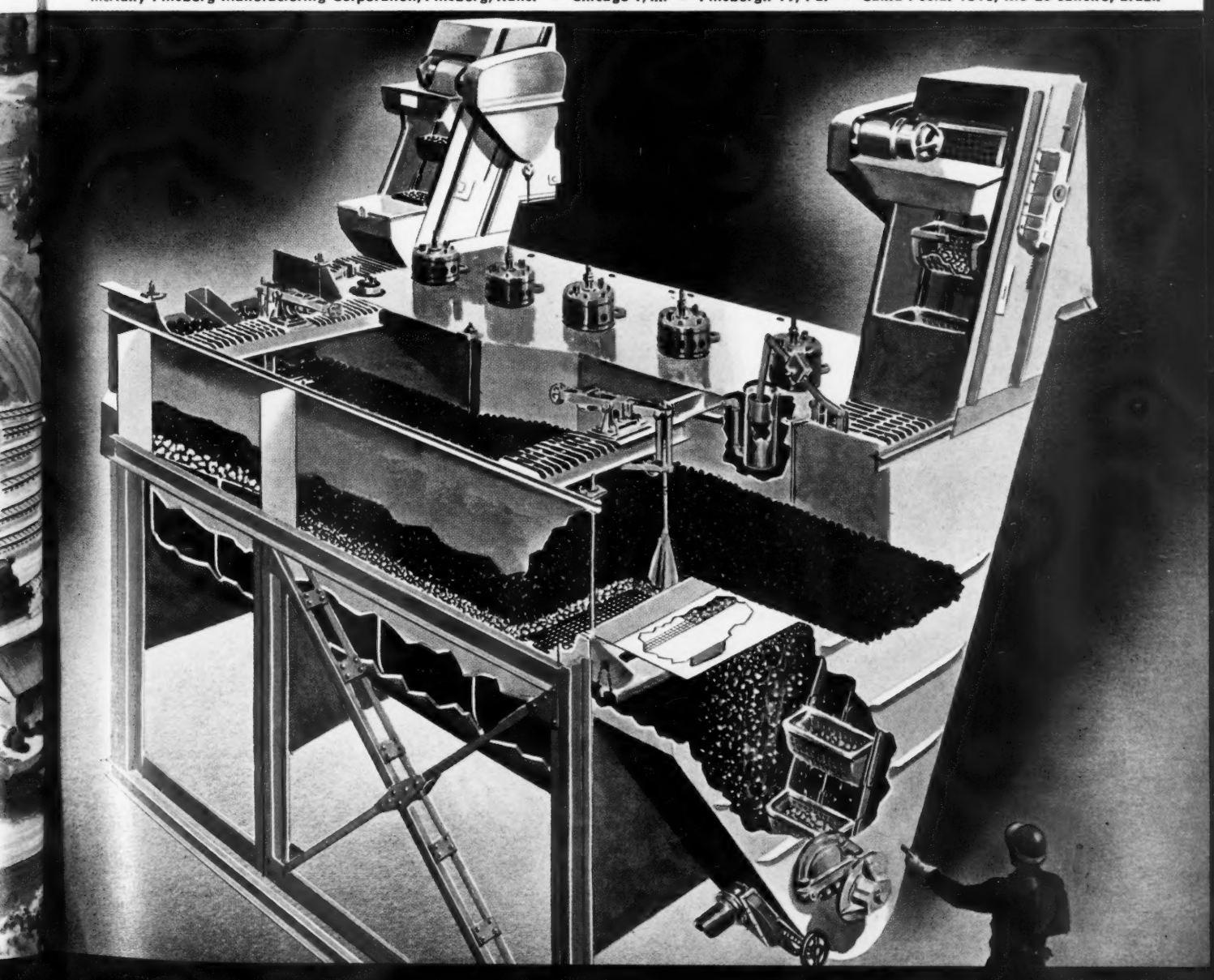
Our engineers are at your service to recommend proper washing equipment to produce any tonnage you may require from 25 tph to 1000 tph and over.



McNALLY PITTSBURG

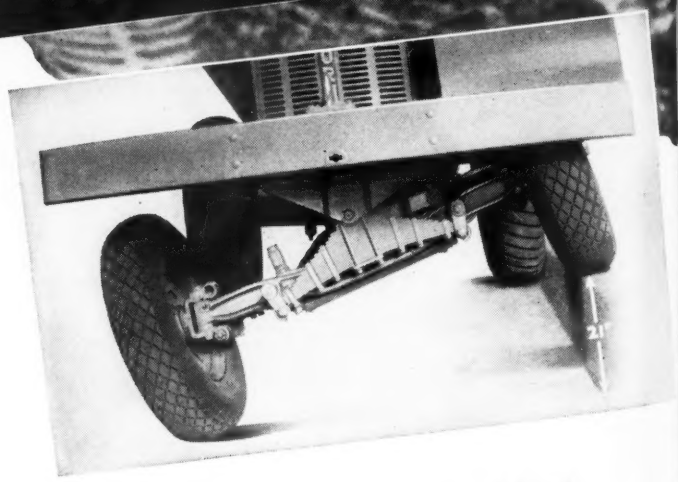
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Ill. • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil



HIGH STEPPING FRONT AXLE TAKES THE TWIST OUT OF HAUL ROAD TRAVEL

Strip mine haul roads aren't boulevards. But twisting strains of ruts and furrows can't get at Dumptor frames, can't make steering tough for Dumptor drivers. Oscillating action of the steering axle, pivot anchored to the frame at one point only, rides along with the strain. Twist is absorbed before it can distort the frame. Heavy leaf springs cushion vertical shocks. Nickel steel I beam is the heavy-duty backbone of the assembly.



Dumptor can climb 21" furrow without frame distortion. Free oscillating front axle, spring mounted, absorbs twisting strains.

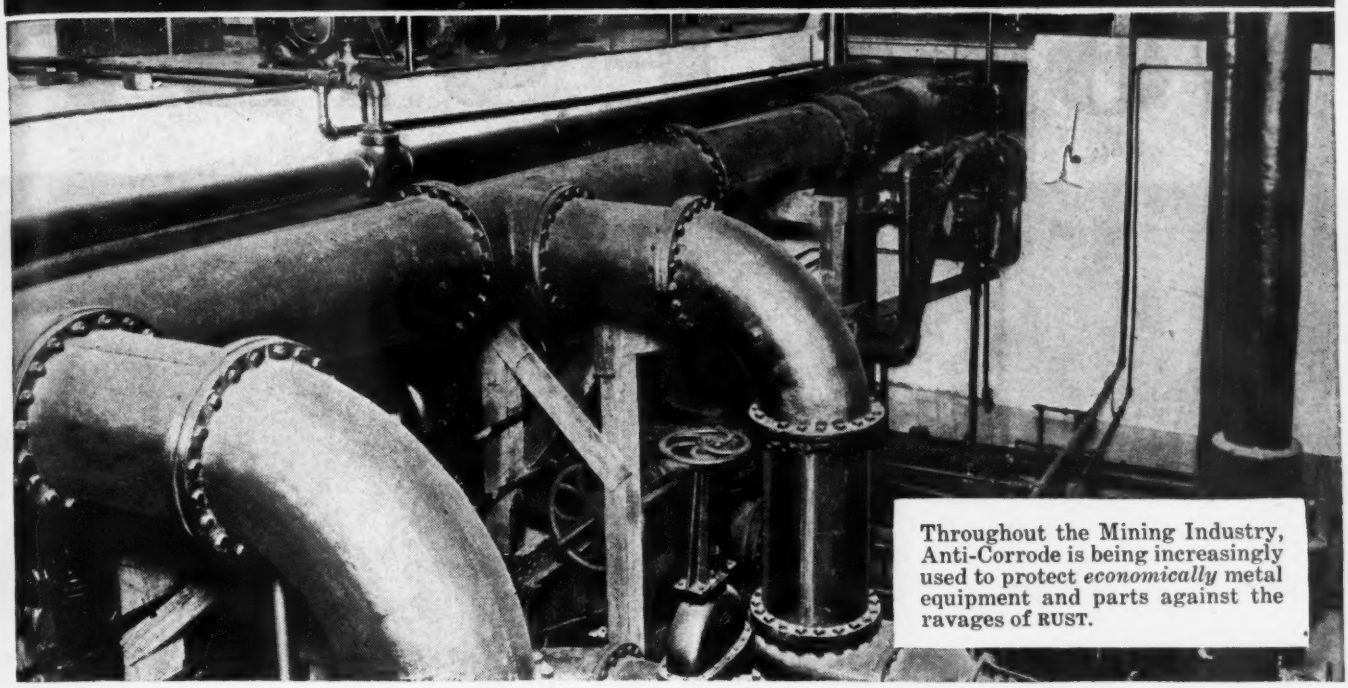
KOEHRING COMPANY *Milwaukee 10, Wis.*

ARMY-NAVY E

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

STOP RUST *this New, Efficient Way—*



Throughout the Mining Industry, Anti-Corrode is being increasingly used to protect *economically* metal equipment and parts against the ravages of RUST.

Anti-Corrode film protects your metal parts and equipment . . . prevents corrosion and rust formations

Anti-Corrode #100 is one of several new types of Cities Service protective coatings for metals. Designed to prevent corrosion of raw stocks, finished parts and completed machines—either in storage or in active service—Anti-Corrode adheres firmly to metal surfaces, displaces moisture and protects longer than similar materials now on the market.

Cities Service Anti-Corrode #100 may be applied by ordinary work-shop methods—spraying, dipping, brushing or rolling. Independent of metal quality, finish and irregularity of surface, the protective film is continuous and non-porous—does not break at sharp edges nor rupture on flat surfaces.

Cities Service Anti-Corrode #100 serves as a lubricant as well as a rust preventive and need not be removed from metal to be stamped, drawn, or otherwise formed. It can be removed simply with kerosene or any petroleum solvent.

CITIES SERVICE OILS — ONCE-ALWAYS

CITIES SERVICE OIL COMPANY

ARKANSAS FUEL OIL COMPANY

ANTI-CORRODE

SAFEGUARD FOR THE MINING INDUSTRY

ANTI-CORRODE Gives You 10 BIG ADVANTAGES

1. Adheres to all metal surfaces.
2. Impervious to humid atmospheres.
3. Water-repellent.
4. Resistant to sun rays.
5. Chemically inert to ferrous and non-ferrous metals.
6. Inhibits *"under"* rusting.
7. Easy to apply—easy to remove.
8. Lubricates as it conserves.
9. Will not become brittle.
10. Protects metals in service or storage.

Whether your problem is to protect a single valuable tool or a million dollars worth of metal or equipment, write now for a free demonstration of Anti-Corrode. Mail the coupon today.

Cities Service Oil Company
Room 270
60 Wall Tower, New York 5, N. Y.

Gentlemen: Please contact me for a FREE demonstration of Anti-Corrode in our plant. (This offer limited to industrial users in Cities Service marketing areas East of the Rockies.)

Name .....

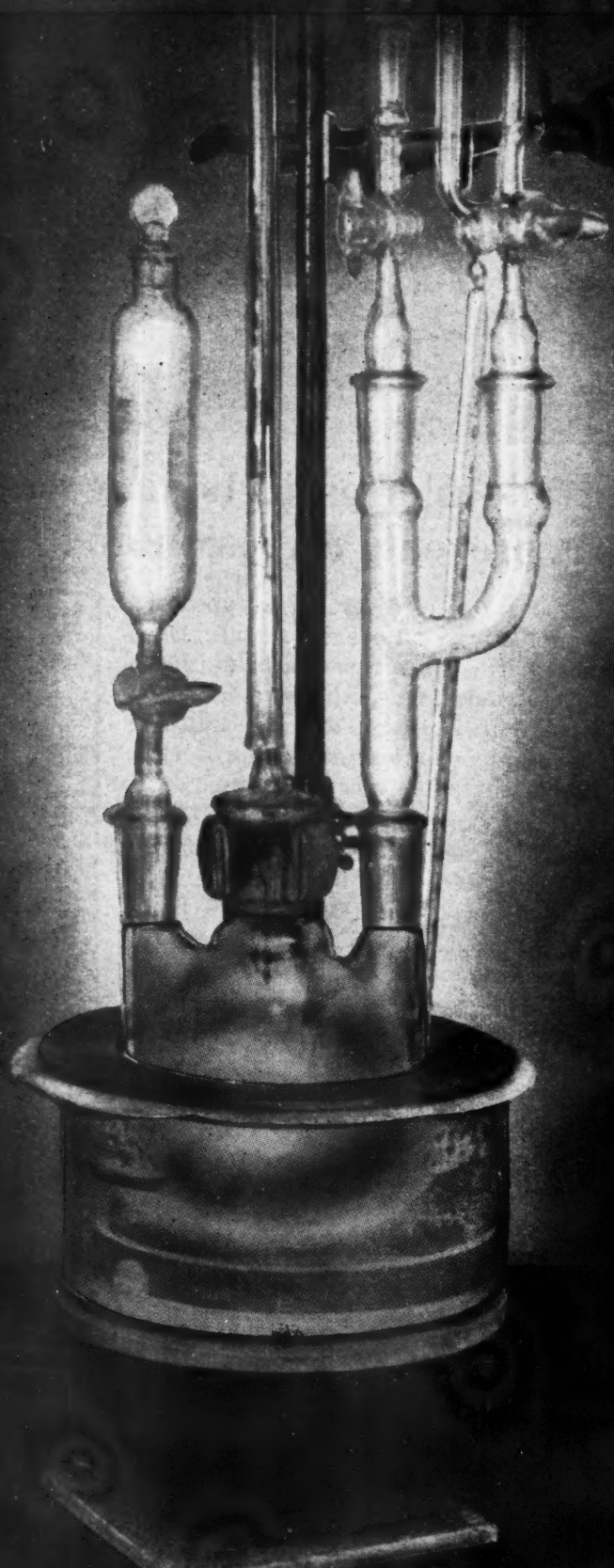
Position .....

Company .....

Address .....

City ..... State .....

TO RESIST



Electronic bombardment of high voltage cable oil under vacuum at 10,000 volts, a test as unique as it is purposeful, is but one indication of the searching investigations here undertaken.

VOLTAGE . . .

Here, wire and cable Research tests every component beyond the severest demands of service-in-the-field.

Looking far beyond today's needs, General Cable Research is prepared for the days when there will be commercial application of voltages beyond those of yesterday and today. Research endeavor is exploring in many directions, examining many products, evaluating the stability of many materials under the severest conceivable conditions. When the demand can be met, General Cable high voltage wires and cables will be available.

GENERAL CABLE CORPORATION

Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

IF YOUR PLANT MAKES YOU MONEY—

...It's a good buy!

★For more than 35 years the Allen & Garcia Company has planned for its clients on that simple basis.

★Our organization is available for immediate planning, consulting, construction and operation.

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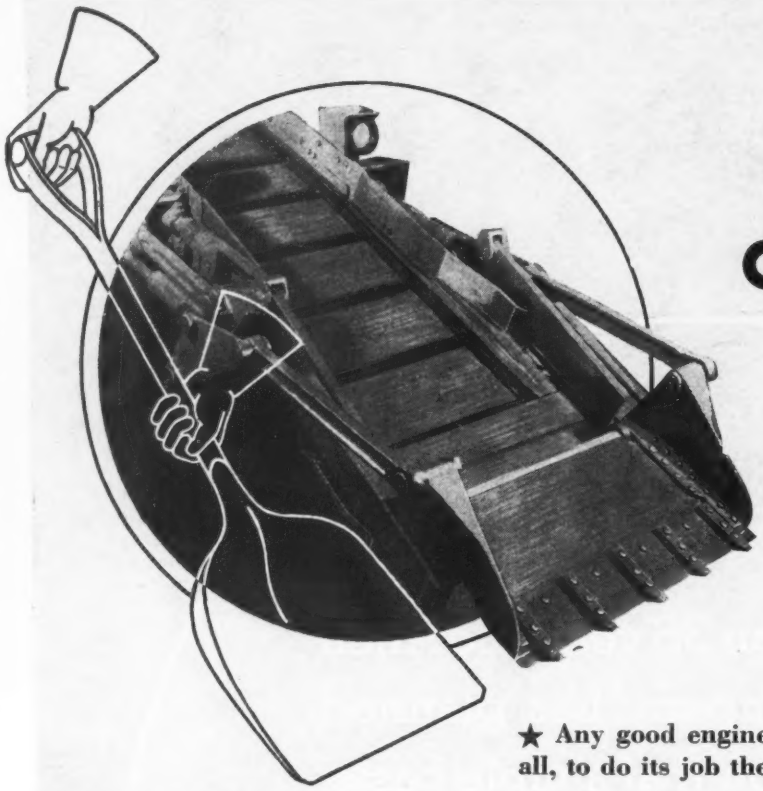


THERE'S ONLY ONE AUTOMATIC MECHANICAL COAL LOADING "SHOVEL"—

There's only one natural way to load coal — shovel it. And the Whaley "Automat" is the only loader that does just that.

★ Any good engineer will tell you—"Design a machine, first of all, to do its job the simplest and most natural way possible".

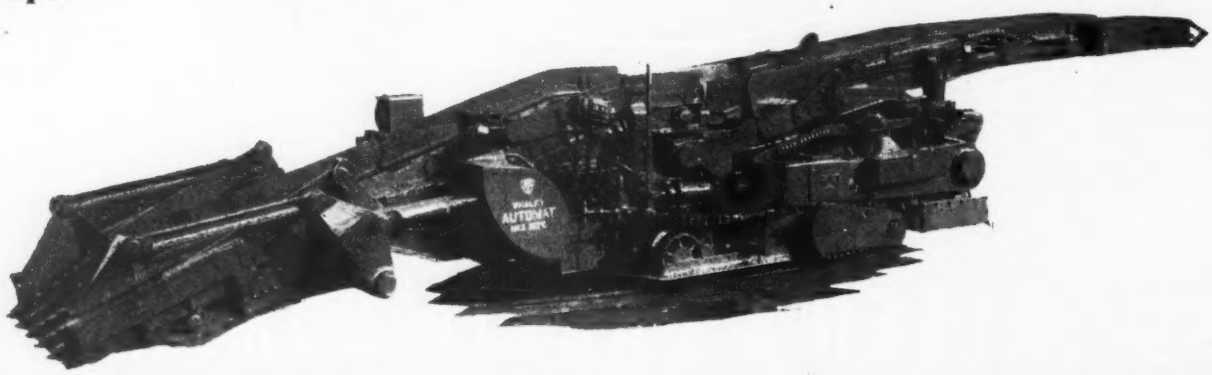
This fundamental engineering principle was the foundation upon which the Whaley "Automat" was designed, perfected and built.

As originators of the first commercially successful underground loading machine and, from the beginning, devoting our time and attention exclusively to underground loaders, you have 37 years of "know how" embodied in the Whaley "Automat" you buy . . . 37 years of constant improvement of loading machines with shoveling action.

Whaley "Automats," numbers 3 and 3LS, stand alone, among large capacity loaders, as the only loader to be powered by one 25 H.P. motor (power consumption 1/5 K.W.H. per ton of material loaded). It stands alone in its ability to load slate or rock, equally as well as coal. It stands alone in its safety of operation. And remember, the "Automat" is built to deliver the goods now and for many years to come . . . for it's the long-life machine.

When writing for details, please state your mining conditions. Myers-Whaley Co., Knoxville 6, Tenn.

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for manufacture and sale in Great Britain and Europe.



MYERS-WHALEY

Mechanical Loaders Exclusively For Over Thirty-Seven Years

THE PAST FORETELLS THE FUTURE

Your copy of this fine book is now ready. You will want it as a guide for the future.

The best guide for your future relations with a man is his reputation in the past.

So it is with business institutions.

Today, more than ever before, every individual business must depend on other individual businesses. And that dependence can, and should, be placed only upon those business institutions whose record of performance as to policy, product, service and general attitude has been flawless in the past.

Many new businesses exist today. Many others, old in years, have not kept young in thinking . . . and are passing from the national picture. This has been the history of business since the world began.

Yet, through all the economic changes, certain institutions have grown old in years, but have kept young in spirit and have constantly improved upon their original reason for existence.

The book illustrated above deals with the history of The Falk Corporation, its ideals, accomplishments, and plans for the future so far as those plans can now be projected.

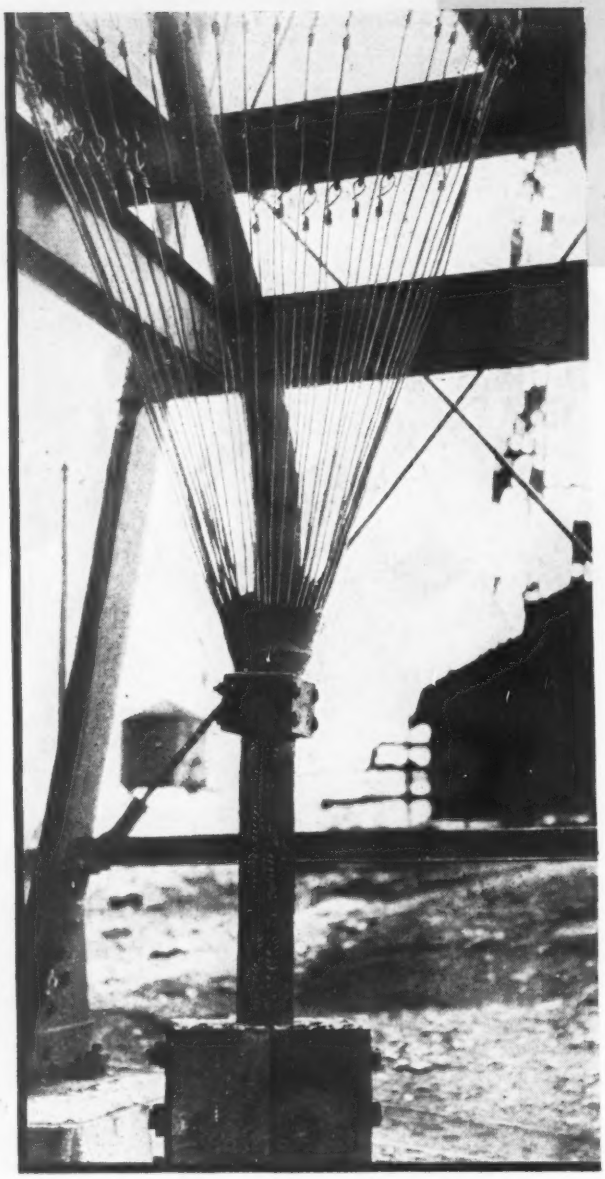
You, too, in your effort to render a service to your industry, must of necessity have followed many of the principles set forth in this book. For that reason we believe that the book will interest you and will provide you with reasons why The Falk Corporation will be a sound source of supply for the machinery you will need to shave pennies from production costs and improve your product, in order to compete in the salesmen's war to come.

THE FALK CORPORATION, *Milwaukee 8 Wisconsin*

IT ALWAYS PAYS TO CONSULT **FALK** . . . A GOOD NAME IN INDUSTRY

For over fifty years
Precision Manufacturers of
Speed Reducers • Motoreducers • Flexible Couplings • Herringbone and Single Helical Gears • Heavy Gear Drives
Marine and Diesel Engine Gear Drives and Clutches • Steel Castings • Contract Welding and Machine Work.

District offices, representatives, or distributors in principal cities.

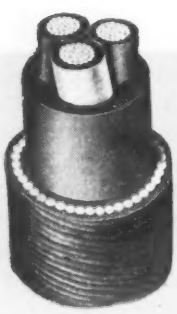


there's BUILT-IN RUGGEDNESS

in Hazard SHAFT and BOREHOLE Cables

• Toughness, resilience, moisture-resistance and non-corrosive qualities are built into every Hazard Shaft and Borehole Cable. Hazard Submarine Insulation, of fully accepted Buna S (GR-S) synthetic rubber, encases each conductor. These are individually taped for further protection. Waterproofed fillers enclosed in another tough rubber jacket surround the cabled conductors. Two types of outer coverings are available — STEEL ARMOR for heavy duty, SPIRALWEAVE for lighter duty. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

Send for 48 page catalog ELECTRICAL CABLES FOR MINING USE



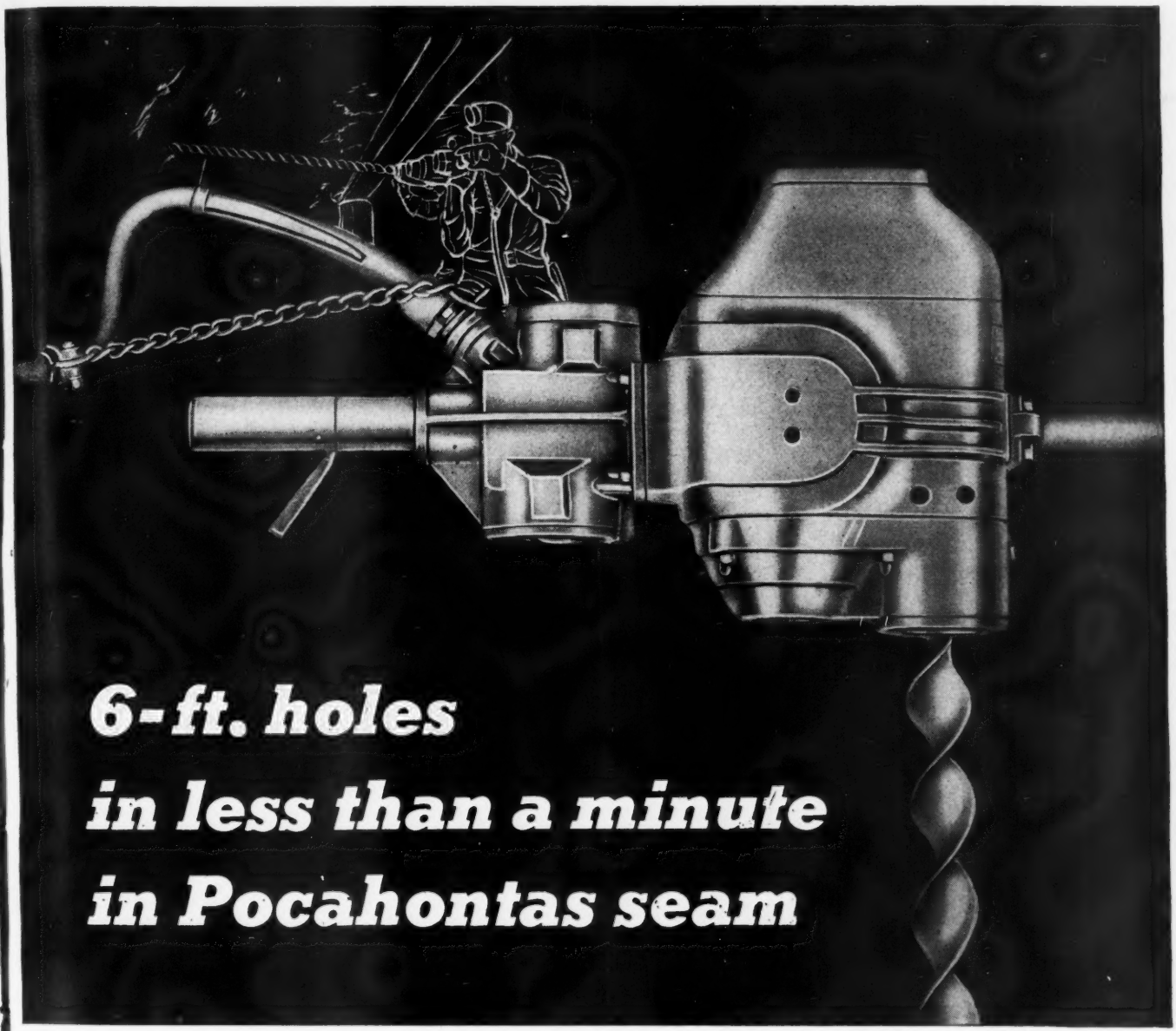
Heavy Duty STEEL ARMORED CABLE has an outer covering formed by strong, galvanized steel wires sealed in asphalted jute, dusted with soap-stone to prevent sticking. Acting as armor guard in dangerous locations, these wires protect the cable against ice and falling rock. They also support the weight of long, heavy cables hung "by the ears" from the surface.

Lighter Duty SPIRALWEAVE CABLE is finished with a heavy "fire-hose" covering of cotton cord woven tightly over the interior rubber sheath. A waterproofing compound slushed over the fabric covering and dusted with flake mica, completes the sturdy, flexible cable. Exceptional longitudinal strength gives Spiralweave Cables ample built-in support when comparatively short lengths are required in shafts or boreholes. The Spiralweave durable sheathing makes it an ideal cable for light weight signal and communication purposes.

HAZARD

insulated wires and cables for every mining use

4028



6-ft. holes in less than a minute in Pocahontas seam

CP-571 Hand-Held Electric Coal Drill

WORLD'S fastest electric coal drill, the "Whippet," CP-571 Hand-Held Drill is equipped with a powerful, compound-wound D.C. motor and special safety clutch, enabling it to set new highs in drilling speeds. Six-foot holes in less than a minute in Pocahontas Seam is typical of the "Whippet's" outstanding performance.

Easily handled by one man in softer coal seams, the CP "Whippet" weighs only 40 lbs. in Open type – 43 lbs. in Permissible model.

Ideal for close quarter work, the record-breaking CP-571 drills parallel holes within 2″ of top and bottom. Write for SP 1995, giving full data on the CP Hand-Held "Whippet."

Chicago Pneumatic manufactures the world's largest line of Hand-Held and Post-Mounted Electric Coal Drills: five sizes in the Hand-Held types and four sizes in the Post-Mounted models.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
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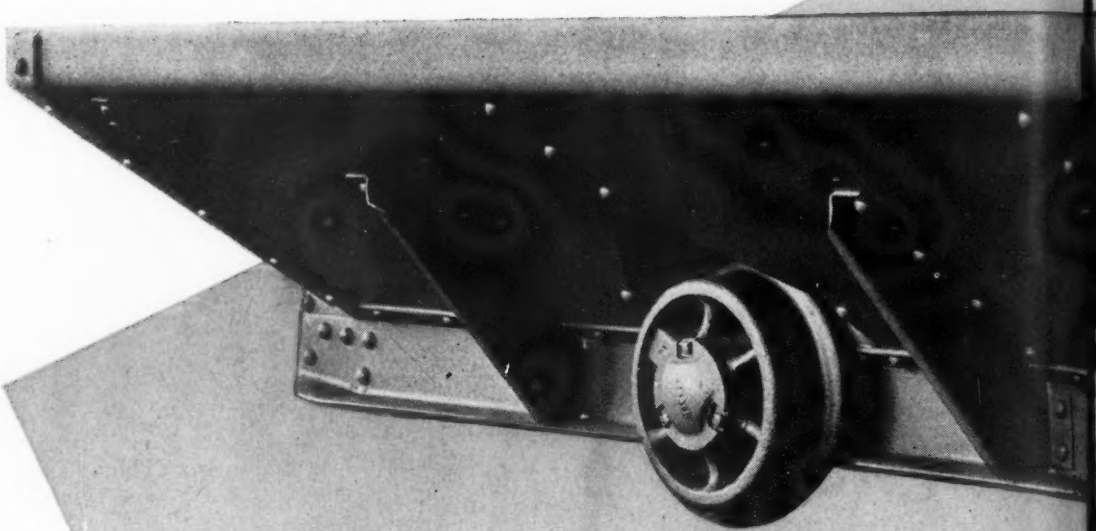
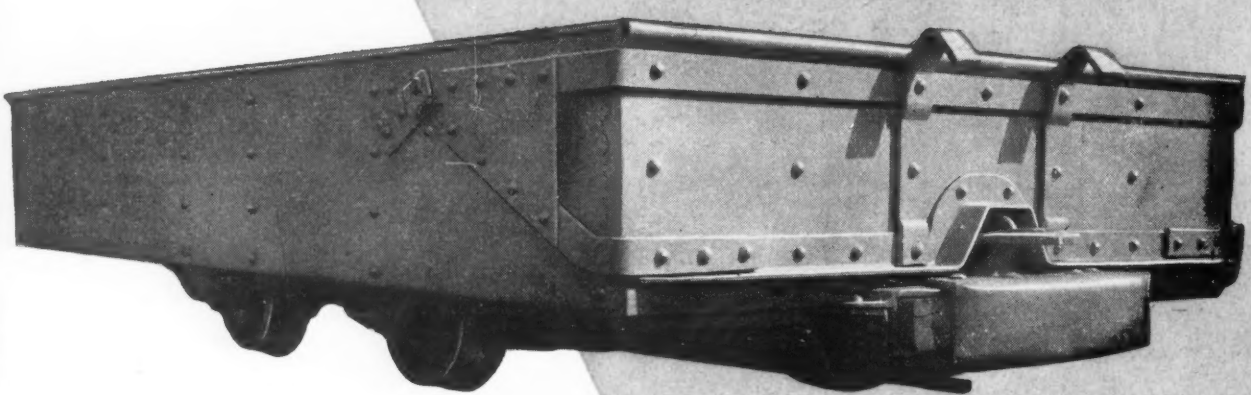
CHICAGO PNEUMATIC
TOOL COMPANY

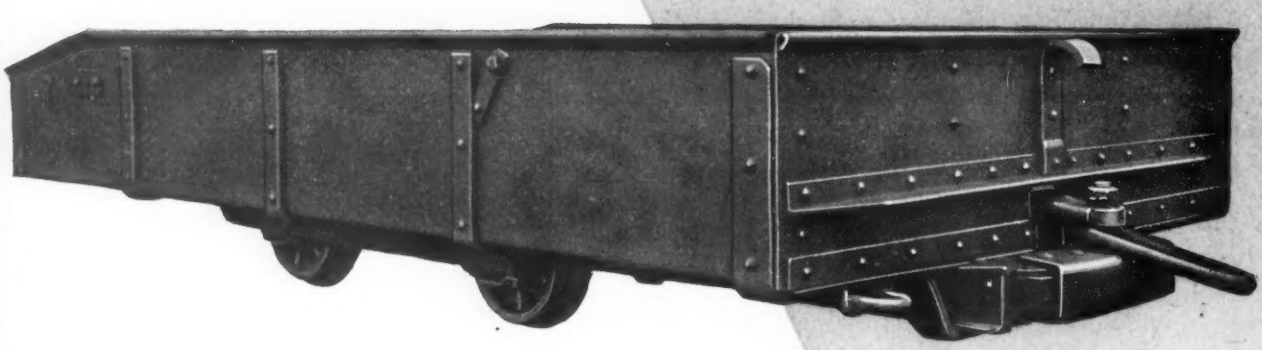
General Offices: 8 East 44th Street, New York 17, N. Y.

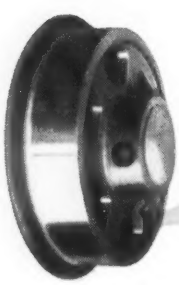
★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

NEW CARS



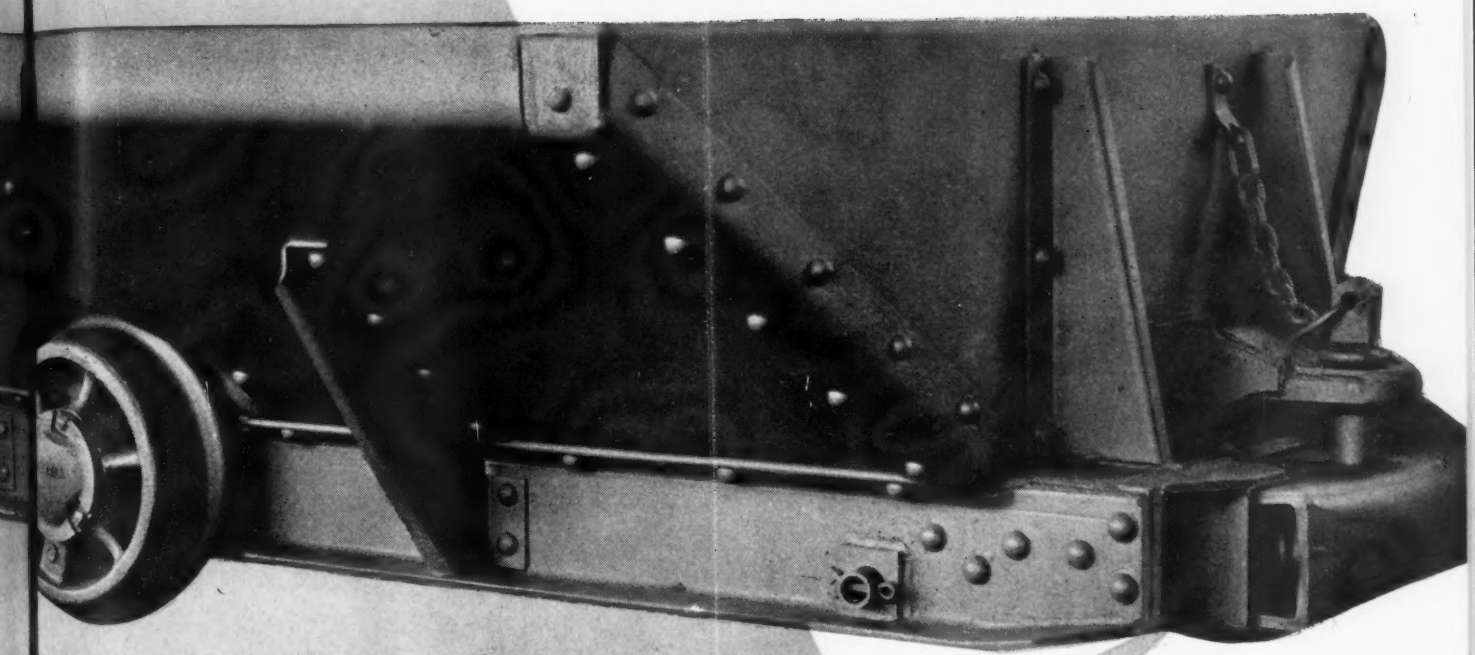






A.C.F. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals — better for mine car wheels than steel or iron, alone.

point the way to...



lower production costs

Now that you have been operating your mine cars for many years and during the last few years at high speed, twenty-four hours per day, you surely are thinking of new cars. When you consider buying new equipment to replace that beyond repair, you will wish to investigate the most modern cars with which to produce coal at the lowest possible cost.

The Automatic Drop Bottom Mine Car should have first consideration. Delivery will be made in a reasonable time.

Place your order now, and we can assure you that when the material is available for manufacture, we will do our best to serve you.

a.c.f.

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NEW YORK CHICAGO ST. LOUIS CLEVELAND PHILADELPHIA BERWICK, PA. PITTSBURGH HUNTINGTON, W. VA.

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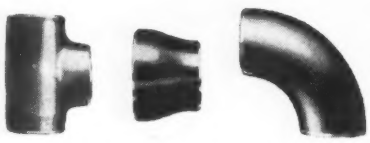
Pipe Fittings

A complete line of standardized types in

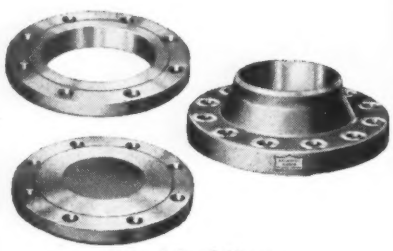
STEEL

in series 150 to 1500

Cast Steel Fittings

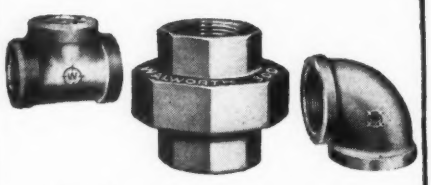


Steel Welding Fittings



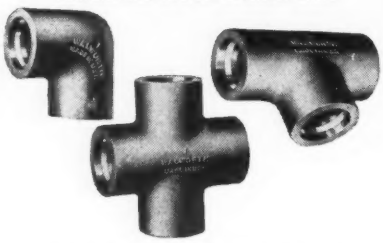
Forged Steel Flanges

BRONZE



125 Lb and 250 Lb, Screwed ends

150 Lb and 300 Lb Walseal ends

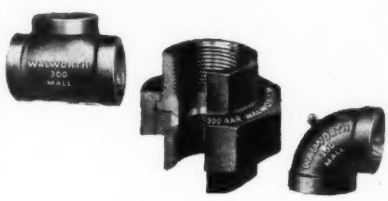


3,000 Lb O.W.G., Walseal ends

IRON

125 Lb and 250 Lb Cast Iron

150 Lb Malleable Iron



300 Lb Malleable Iron

Walworth's comprehensive line of pipe fittings is made in a wide range of types and sizes to meet every piping requirement. A few of the many regular Walworth fittings are illustrated above. All Walworth fittings are made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, they reflect Walworth's 103 years' experience in the manufacture of quality valves and fittings.

For detailed information on Walworth's complete line of valves, fittings, and pipe wrenches, see your local Walworth distributor or write for a free copy of Catalog 42.

12 AWARDS
TO 4 PLANTS

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valves AND fittings

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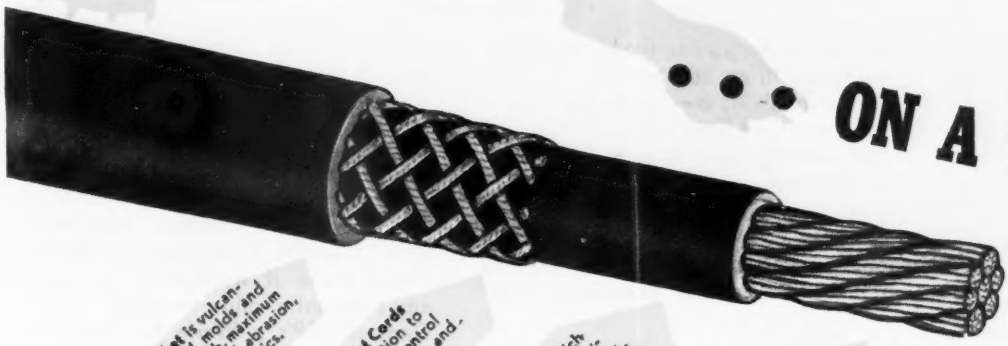
LABORATORY CONTROL

To assure strict adherence to specifications, sample test bars of the metals from which Walworth Pipe Fittings are made are subjected to regular testing in Walworth laboratories. These and other regular controls and inspections assure the high quality of all Walworth Pipe Fittings. The illustration shows a test on a cast iron transverse bar.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

"This is mighty tough stuff," says Romey

BUILT FOR LONG SERVICE ... ON A TOUGH JOB

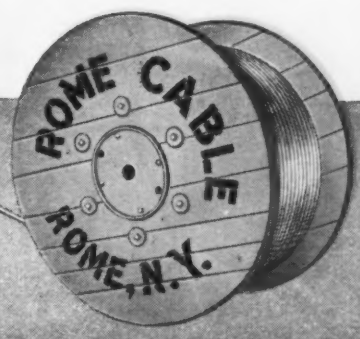

The Neoprene Jacket is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.
Heavy Twine Reinforcement Cords are applied over the insulation to strengthen the cable and control adhesion between insulation and jacket.
A Special Insulation is used, which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.
The Conductor is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

ROME "60-38"
Single Conductor
Locomotive
Gathering Cable

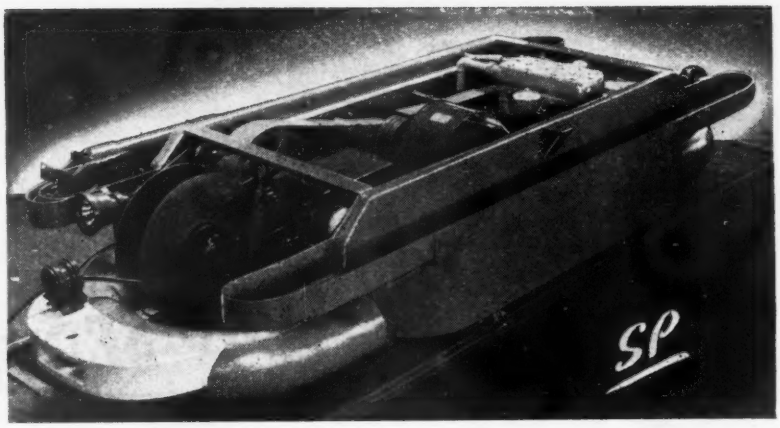
There's extra "mileage" built into every inch of this tough cable, which is recommended for electric locomotives of the gathering reel type — a service requiring a flexible, heavy duty portable cable in which extreme adhesion of the insulation to the conductor is desired.

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK



YOU CAN DO MORE DRILLING AT MORE PLACES FASTER WITH A CANTRELL "SP" COMPRESSOR



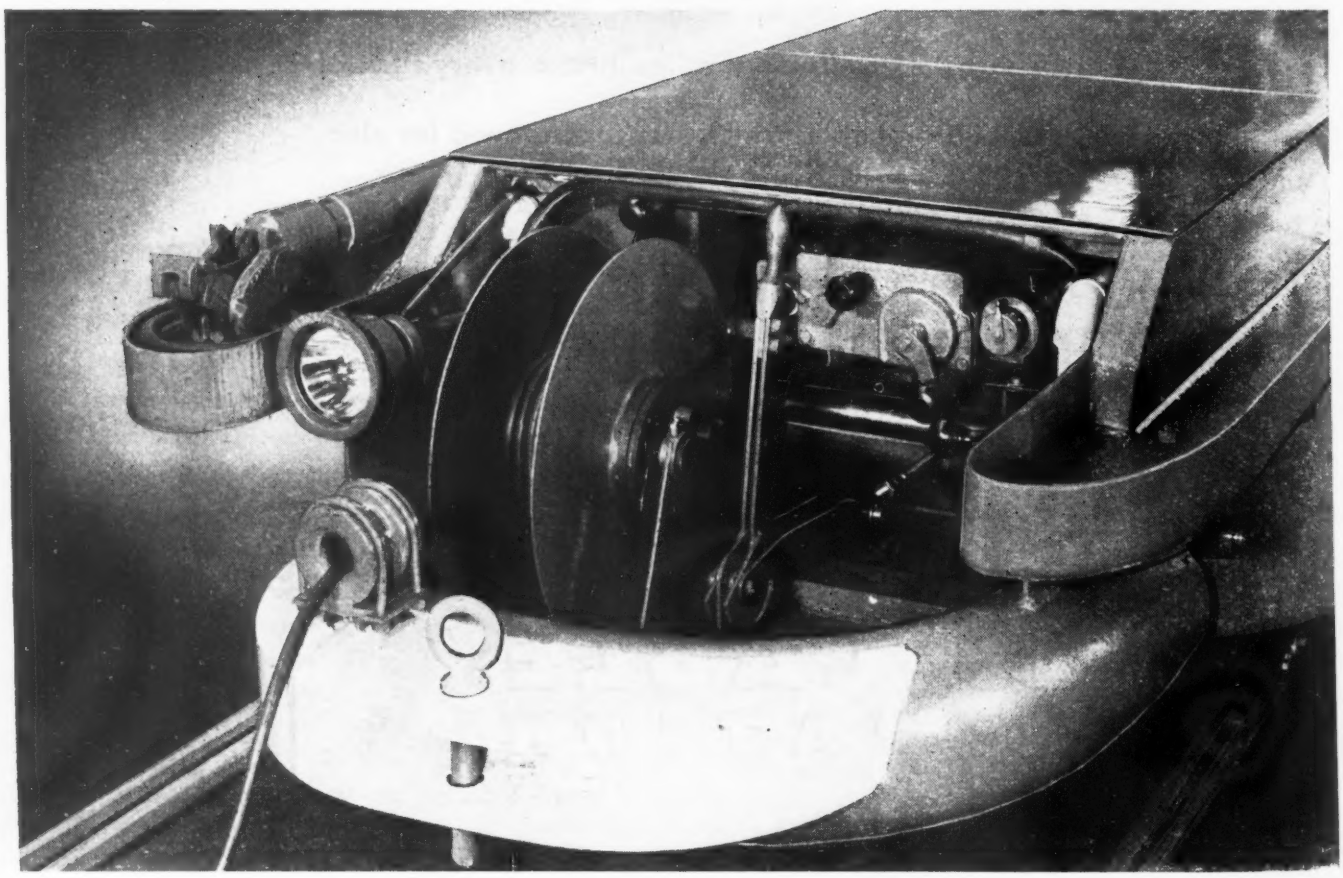
★ The Cantrell Type SP Compressor has, unquestionably, become recognized as an essential machine in coal mining. Equipment no mine can afford to be without, because it has enlarged, tremendously, the field of usefulness for a compressor.

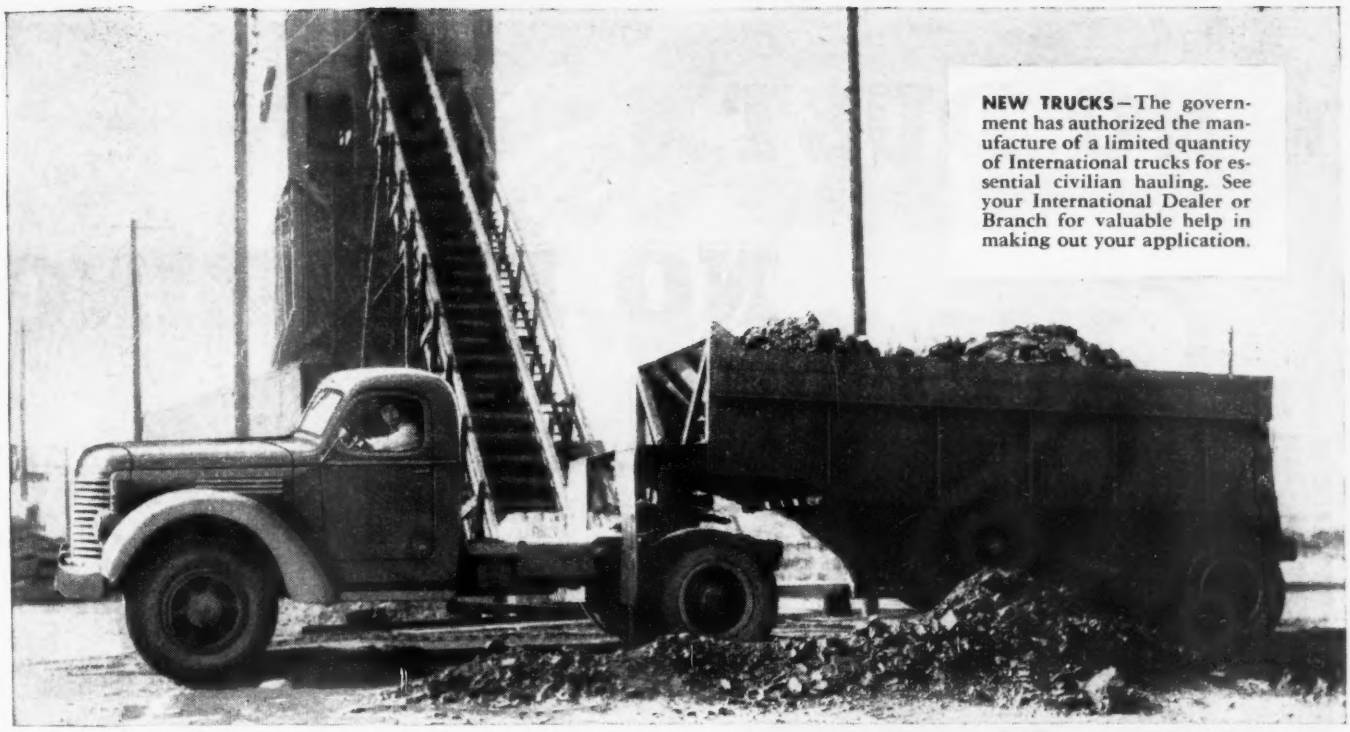
You see, the Cantrell, Type SP, is more than a heavy duty air compressor. It is a self-contained locomotive, capable of rapid tramming to any point. Upon arrival at job, power is instantly changed from tramming to compressor . . . as simply as changing gears in an automobile. In addition, it hauls its own tools and repair equipment. Mines using the Cantrell "SP" will tell you it is indispensable to efficient mining. In addition to regular drilling work, you use the Cantrell "SP" for ditch lining, leveling haulways, hauling repairs, shifting pumps and mining machines, chipping, riveting, blowing substations, and, it takes you there, gets the job done, brings you back . . . all under its own power . . . a new, broader service in a complete air compressor.

The low initial cost of the Cantrell "SP", and, in addition, our valuable "Cantrell Compressor Exchange Plan", make it worthwhile for most any substantial mine to utilize several Cantrell "SP's". Write for complete details now, to Imperial Bronze Manufacturing Co., Jellico, Tenn.

Note below the control end and operator's seat for the new Cantrell "SP." One shift of the lever and machine is transformed from locomotive to compressor or vice-versa. Shown at right is compressor complete with quickly removable safety top.

Cantrell COMPRESSORS





NEW TRUCKS—The government has authorized the manufacture of a limited quantity of International trucks for essential civilian hauling. See your International Dealer or Branch for valuable help in making out your application.

"WE ARE PROUD TO OWN THESE TRUCKS"

A Performance Report of 3 INTERNATIONAL KR-11's

"EARLY IN 1944 the Freelandville Implement Company sold us three International KR-11's for our strip mine at Edwardsport," reports John Kerzan, Manager, Edwardsport Fuel and Supply—Division of Public Service Company of Indiana, Inc.

"Formerly we operated seven smaller units to do the work. The KR-11's average 36 trips each day from the tipple to the shovel and return, and haul payloads from 13½ to 17 tons. Their gross weight loaded ranges from 47,000 to 55,000 pounds. Two of the units pull drop-bottom coal cars and each moves approximately 500 tons per day.

"These trucks spend considerable time with the motor running idle, both while loading in the pit and unloading at the tipple, but still average 3½ miles per gallon."

"We are very proud to own these trucks. Our only regret is that we did not purchase them earlier so that we might have had the benefit of the reduced operating cost for a longer period."

Owner: Edwardsport Fuel and Supply—Division of Public Service Co. of Indiana, Inc. Edwardsport, Indiana.

INTERNATIONAL

Three Internationals, Model KR-11;
Wheelbase, 134 Inches
Engines: International Red Diamond 450
Axle Ratios: 8.05 to 1
Transmissions: Direct in Fifth
Body: Drop-Bottom Semi-Trailer
Payloads: 13½ to 17 tons
Tires: 11.00 x 20 – 12 ply

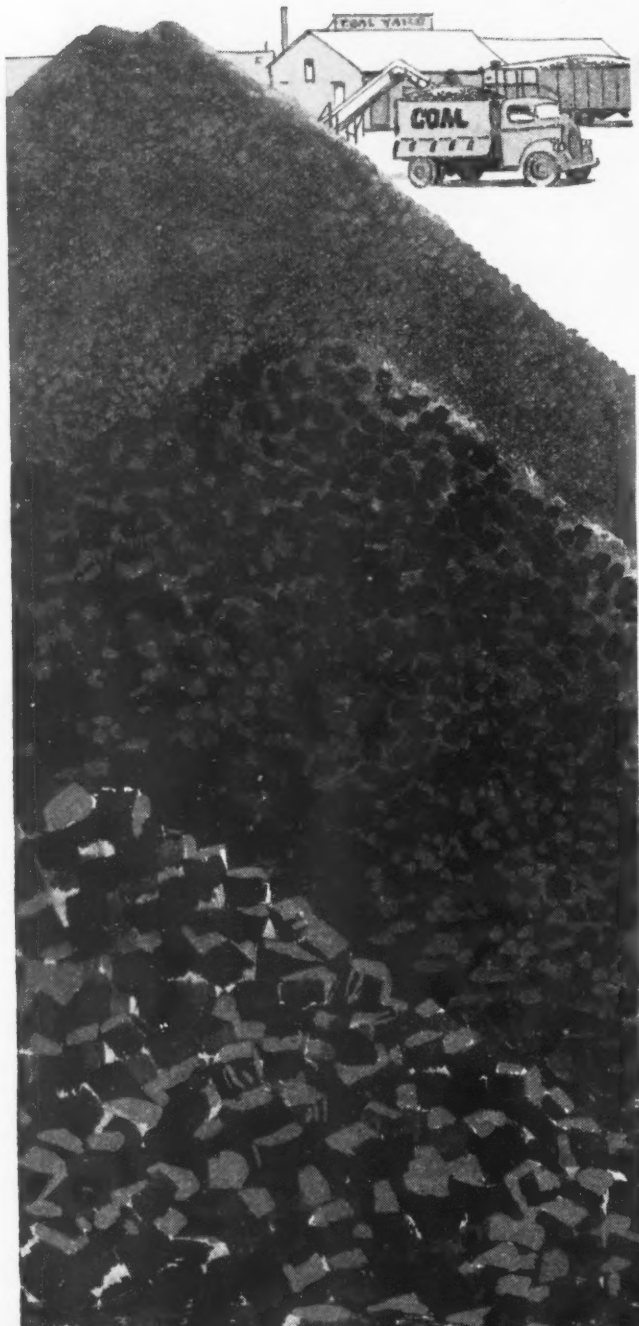
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

HARVESTER

INTERNATIONAL *Trucks*

NO DUST

NO FREEZING



SERVING BOTH HOME AND INDUSTRY

The benefits of freezeproofing and dustproofing coal with calcium chloride go far beyond pleasing the housewife — yes, even beyond helping the dealer.

One industrial organization, which is treating its power plant fuel, points out that they:

Make sufficient savings of windage losses to pay for the treatment.

Make substantial labor savings in unloading costs during freezing weather.

Reduce damage to cars which occurs when coal is frozen solid.

Get substantially improved furnace efficiency and a much cleaner plant.

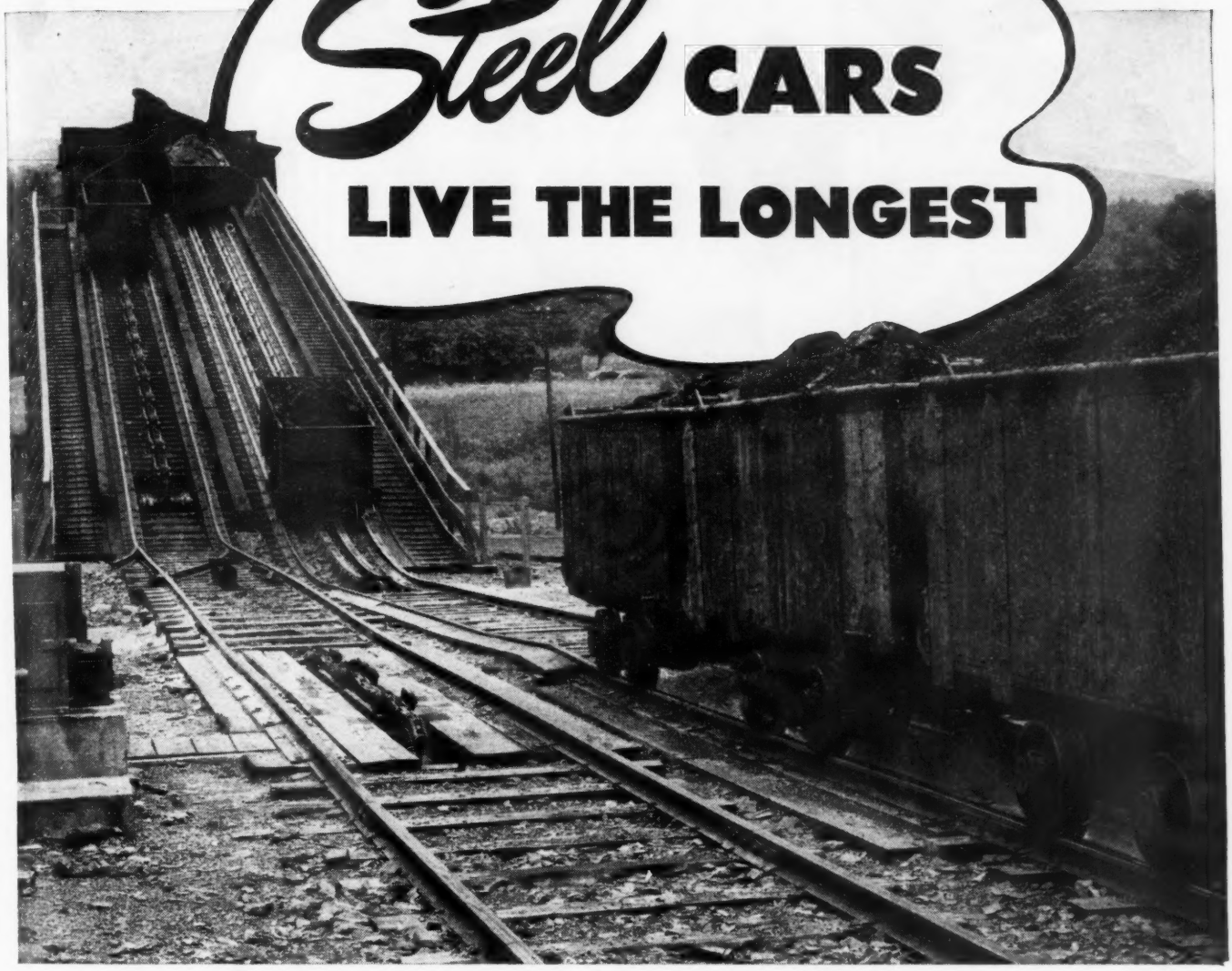
Yes, there is more to calcium chloride coal treatment than meets the eye. If you forget about pleasing housewives, about demurrage and dealer annoyance you will find many other advantages to coal users that make them ask for the calcium chloride dustproofing-freezeproofing treatment.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Bldg., Detroit 26, Mich.

DUSTPROOF AND FREEZEPROOF COAL *with*

CALCIUM CHLORIDE

Steel CARS LIVE THE LONGEST



These Bethlehem mine cars don't see much of the world, even though they travel thousands of miles every year. What they do see is tough, bruising, battering service, day after day, as they make the round trip in the stomach of an anthracite mine.

That's why they're all-steel: because no kind of car stands up like a steel car. When it's all-steel, it lasts for years in heavy-duty service, and its ruggedness eliminates the need for extensive repair facilities.

Bethlehem builds mine cars for every type of system. Maybe you're looking for an end-dump car with automatic couplers, like the ones shown in the picture. Or perhaps this design isn't suitable for your particular layout. In any case, Bethlehem can build you whatever kind of cars you need, for either bituminous or anthracite mining.

Bethlehem has been building steel mine cars for years, to meet every kind of condition encountered in mine transportation. That's why we suggest that you check with our engineers before you place your next mine-car business.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

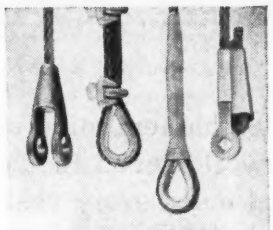
BEACH-HEAD BULL SESSION

"Tex" was formerly a driller in the oil fields; Oscar, a rigger in a logging camp; Joe, a dragline operator; and Bill, a shovel runner for a construction outfit. Now they, and thousands like them, are building bases 'round the world.

In a bull session they'll gripe about lots of things—but mention *pre*formed wire rope and they change their tune. Back home, in scores of industries, they learned an affectionate respect for its dependability. And on foreign soil, with supplies hard to get and time at a premium, stout wire rope is doubly vital.

WISSCOLAY *Pre*formed Wire Rope, manufactured by Wickwire Spencer, not only lasts longer, but it's easier to cut, splice and install —safer to handle. Using it saves money, man hours and critical material. Wisscolay *Pre*formed, like regular Wickwire Rope, is made in all sizes and constructions.

If you have a wire rope question our wire rope engineers will be glad to be of service. Call or write our nearest branch office or Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, New York.



WHICH ATTACHMENT IS BEST?

The proper types of attachments and applications are two of the many useful ideas you'll find in "Know Your Ropes." This 82-page book contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts. It can help make your present wire rope last longer.

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FREE COPY TODAY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

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IN EVERY SERVICE U.S. TIRES EXCEL!

Each of these U. S. Royals is built to excel at a specific job. The U. S. Royal Con-Trak-Tor—stronger than ever with extra-strength, extra-gauge rayon cords—excels at tough, off-the-road jobs. The U. S. Royal Road Grader—with specially designed traction tread—excels at road work, levelling the road bed, clearing the way for the rollers. The U.S. Royal Fleetway—with extra-strong tire body to protect against body breaks—excels at giving long miles of dependable, over-the-highway service. It can be recapped time and time again.

But whatever the job—whatever your make of tires—keep them rolling safely—keep them working to make every tire mile count toward victory.

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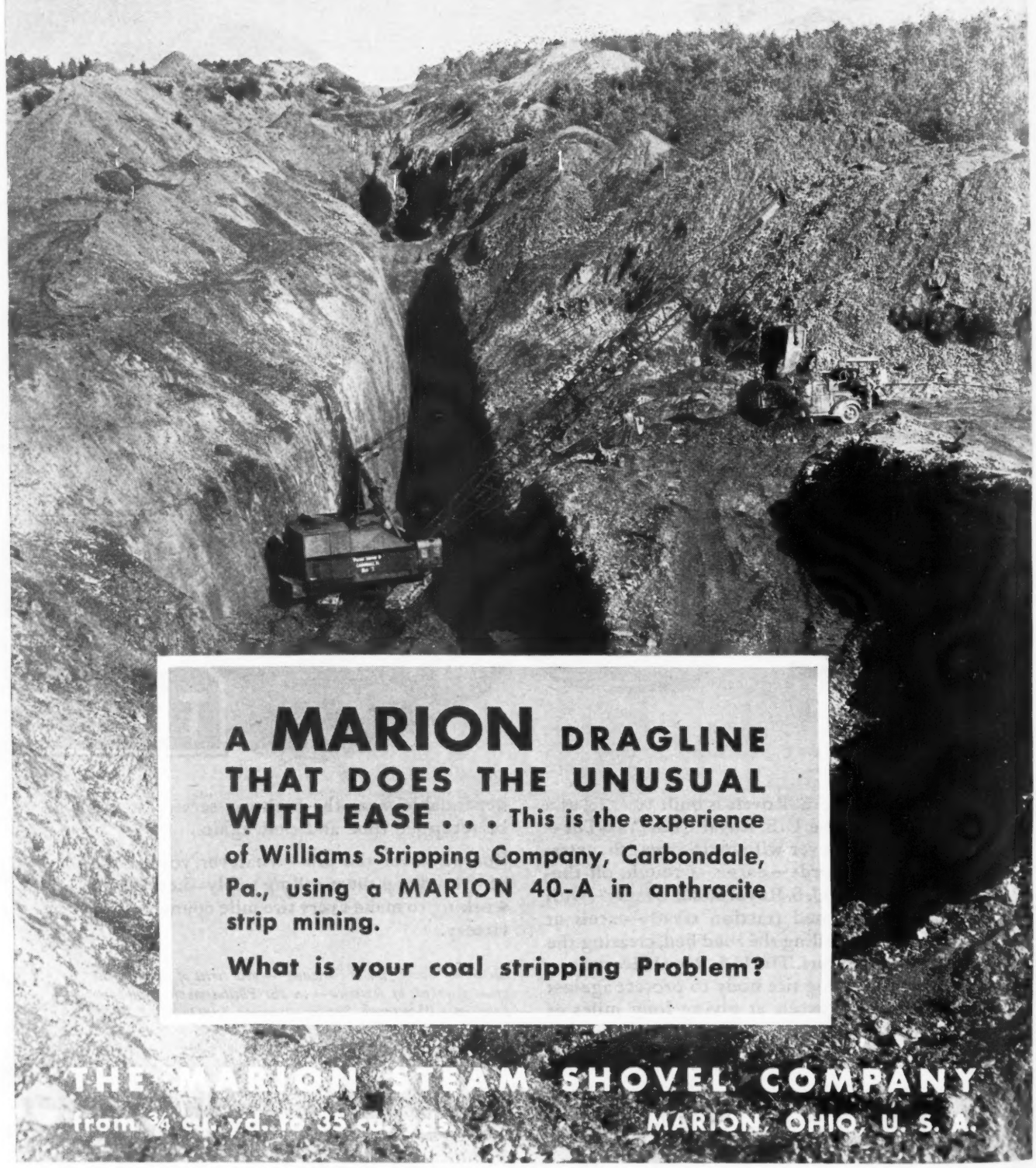
That Speaks for Itself!



A MARION DRAGLINE THAT DOES THE UNUSUAL WITH EASE . . . This is the experience of Williams Stripping Company, Carbondale, Pa., using a MARION 40-A in anthracite strip mining.

What is your coal stripping Problem?

THE MARION STEAM SHOVEL COMPANY

from ¾ cu. yd. to 35 cu. yds. MARION, OHIO, U. S. A.

DOW CORNING

SILICONES

DOW CORNING, first in silicones, is fully equipped with new plant and facilities for the production and distribution of an expanding line of silicone products

American industry has been quick to utilize the new Dow Corning Silicones—to see the potentialities inherent in their higher order of heat stability, chemical inertness, water resistance, and dielectric properties. Dow Corning is now supplying, directly or through selected distributors, the following silicone products:

DC FLUIDS Water-white, odorless, inert Silicone Liquids . . . notable for their low rate of viscosity change over a wide temperature range, low vapor pressure, water repellency, and good dielectric properties.

DC 4 Ignition Sealing Compound . . . an easily applied silicone waterproofing compound having excellent dielectric properties, corona resistance, and the consistency of petroleum jelly. It neither hardens nor melts at temperatures ranging from −40° F. to 400° F.

DC 7 Special Low Temperature Compound . . . an oxidation resistant lubricant and sealing compound developed for use at temperatures as low as −70° F.

DC 31 A lubricating Silicone Grease for special applications in the temperature range of −70° F. to 190° F.

DC 41 A lubricating Silicone Grease for special applications where operating temperatures range from 0° F. to 400° F.

DC 993 Insulating Varnish . . . recommended because of its extreme heat stability for impregnating, coating and bonding, and waterproofing inorganic insulating materials such as asbestos, mica, and Fiberglas cloth, tape, and sleeving. Other special purpose silicone resins and compounds are available.

DC STOPCOCK GREASE A chemically resistant Silicone Grease for lubricating stopcocks and other ground glass joints.

DC PLUG COCK GREASE A Silicone Grease that affords easy operation of lubricated plug valves over wide temperature ranges in most difficult services.

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MIDLAND, MICHIGAN
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FIRST IN SILICONES

THEY ALL DO MORE ON Firestone

EVERY contractor knows that profits depend upon completing each job with the lowest possible expense. That calls for power-driven equipment mounted on Firestone tires.

Big, tough and rugged, these tires are built specifically for the job of making modern earth-moving equipment more profitable.

Unexcelled for strength and quality, Firestone tires stay on the job longer, on all machines . . . under all conditions. That's why you can depend on them to increase the operating efficiency of your equipment.

For the best in music, listen to the "Voice of Firestone" with Richard Crooks and Gladys Swarthout and the Firestone Symphony Orchestra conducted by Howard Barlow every Monday evening over NBC network.

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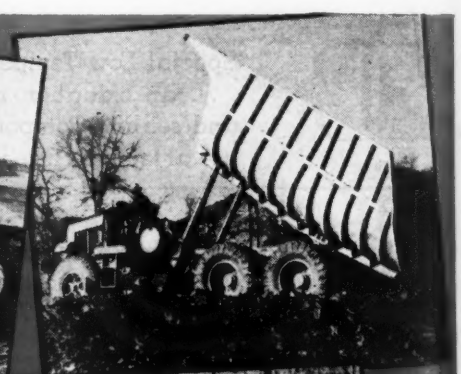

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OFF-THE-HIGHWAY TIRES

STRETCHEROO

One of the brutal tests which U. S. Royal Cords and Cables must pass in the laboratory is nicknamed "Stretcheroo". Lengths are stretched and s-t-r-e-t-c-h-e-d . . . their change in length and appearance carefully noted at each stage until they reach the breaking point.

Only when U. S. Royal Cords and Cables have thus been tried and tested . . . only when they have been tried, too, by heat, cold, impact, compression, and bend are they offered to you under the "U. S." seal—and denoted "Safety Tested".

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony program. CBS network, Sunday afternoon 3:00 to 4:30 E.W.T.

THE NEW
U. S. ROYAL
Safety Tested
MINING MACHINE AND LOCOMOTIVE CABLES

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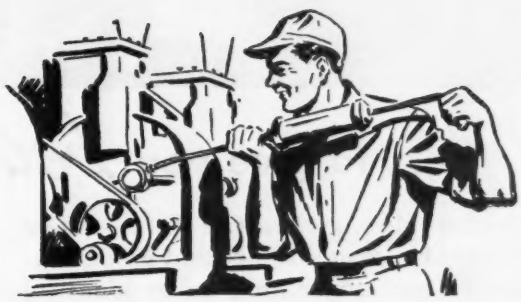
LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

For easier handling in grease guns . . . longer life in anti-friction bearings



• THOSE TWO ADVANTAGES—easier handling, longer life—can materially reduce lubricating cost on the many anti-friction bearings in motors and machines in your plant. Stanobar Grease is a newcomer in the Standard Oil line—developed during the war. It has been tried in the proving ground of severe wartime demands and has made good on every claim for it.

Stanobar Grease was specifically designed to provide the benefits listed at the right. A Standard Oil Lubrication Engineer will be glad to help you put these cost-reducing qualities of Stanobar to work on your equipment. Write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois, for the Engineer nearest you.

Easier handling in grease guns and central lubricating systems is the result of the smooth (non-fibrous) structure of Stanobar. Two grades—Stanobar No. 2 for grease gun or hand-packing applications, and Stanobar "S," a soft consistency for volume dispensing in central lubricating systems—meet practically all anti-friction bearing requirements.

Longer lasting quality in Stanobar is obtained by the use of a special inhibitor which prevents oxidation. This means longer periods of operation between filling or cleaning and packing bearings.

Greater resistance to thinning out when "worked" in bearings reduces the possibility of leakage and may also permit the use of one grade of Stanobar in place of three or four greases now needed for various plant requirements.

Easy application is an advantage of Stanobar which is unusual in many greases suitable for high temperature service.

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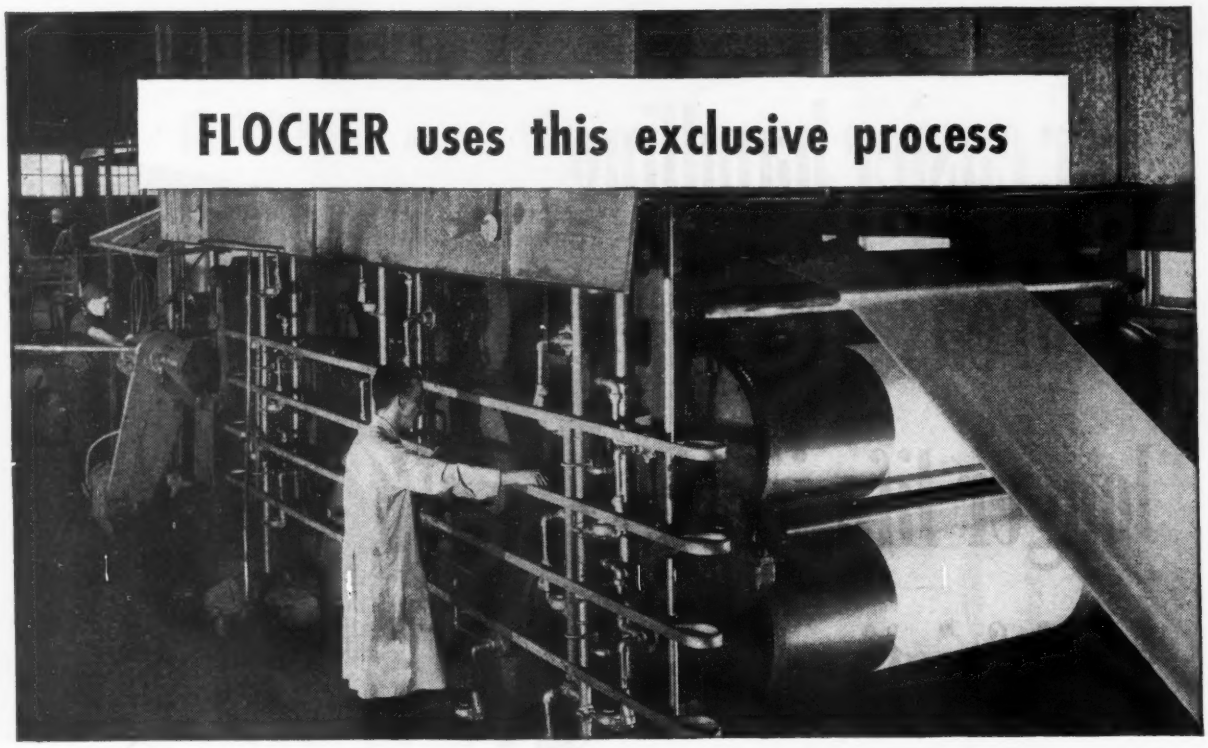
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .



. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE— Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE — Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

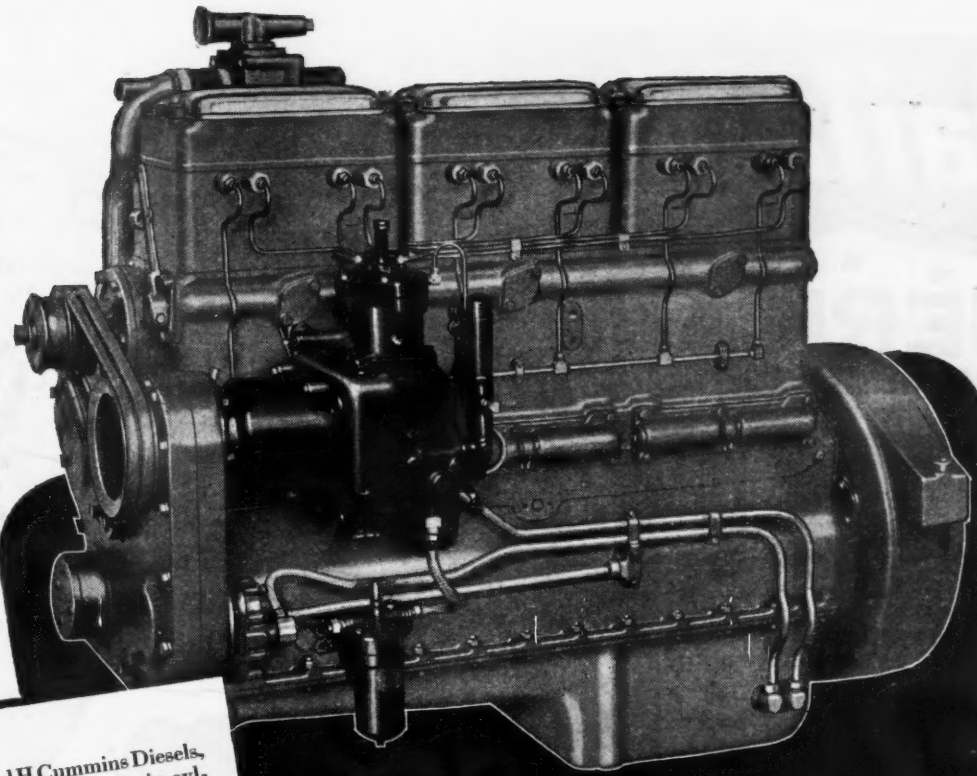
STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

JOHN FLOCKER AND COMPANY

644 GRANT STREET, PITTSBURGH 30, PA.

Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope



H Model H Cummins Diesels, 4⅞" x 6", four or six cylinders, develop their maximum 100 and 150 hp., respectively, at 1800 rpm. Designed for—and proved in—various types of wheel and track-mounted equipment and stationary applications.

NH Series NH-600 and NHS-600 (supercharged) Cummins Diesels, 5⅛" x 6", develop maximum 200 and 275 hp., respectively, at 2100 rpm. Both are six-cylinder, dual valve engines . . . similar in design, weight and dimensions to the Model H. Automotive and industrial models.

L Model L Cummins Diesel, 7" x 10", six cylinders, develops maximum 250 hp. at 1000 rpm. This heavy-duty, medium speed engine is designed for shovels, draglines, cranes, locomotives, etc., and for stationary applications and generating service.

READ the record! The record of Cummins Dependable Diesels in both shaft and open pit mining service . . . in heavy-duty trucks, shovels, locomotives and in stationary applications. Read that record and you will find proof that Cummins-powered means "powered for profit."

CUMMINS ENGINE CO., INC., Columbus, Ind.

CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

Available-

AMERICAN
CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

• *Magazines*
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AMERICAN EXPLOSIVES

From well-located plants and distributing magazines, AMERICAN explosives and blasting supplies are available for delivery throughout the eastern and middle-western sections of the United States. Produced under intensive research, chemical control, inspection and unremitting care in manufacture, there is an AMERICAN explosive suited to your requirement.

• *Capable field engineers are available at your call.*

★ **HIGH EXPLOSIVES**

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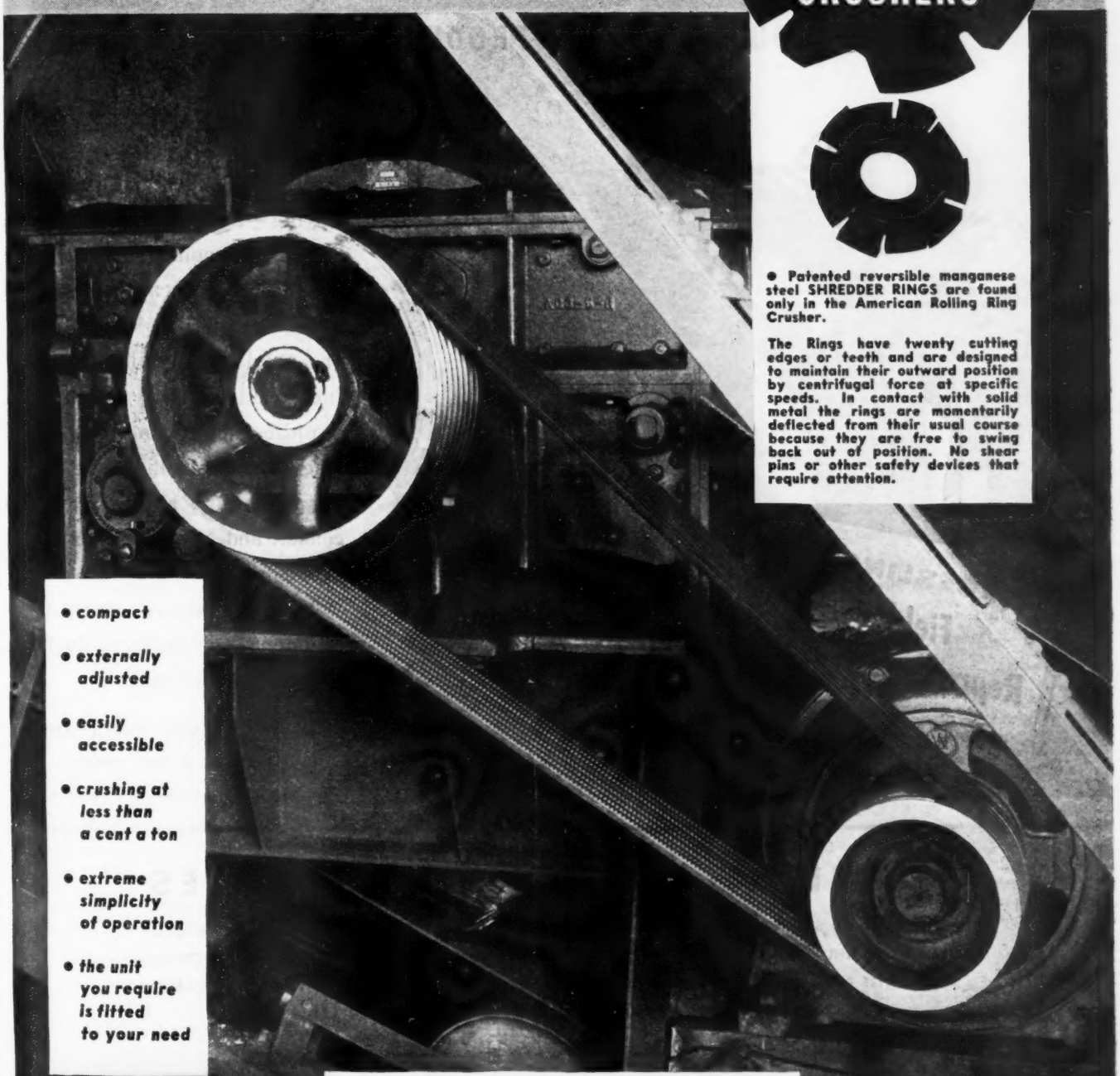
SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

EQUIP FOR GREATER RANGE OF *Reduction* IN CRUSHING . . .

AMERICAN ROLLING RING CRUSHERS



- Patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher.

The Rings have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at specific speeds. In contact with solid metal the rings are momentarily deflected from their usual course because they are free to swing back out of position. No shear pins or other safety devices that require attention.

- *compact*
- *externally adjusted*
- *easily accessible*
- *crushing at less than a cent a ton*
- *extreme simplicity of operation*
- *the unit you require is fitted to your need*

Let us survey your requirements and make recommendations

AMEREICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS, 10, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

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Two Shoulders to the Reel!

TO GIVE YOU THE BEST IN PRODUCTS AND SERVICE

PRODUCT AND SERVICE are the two most important factors in buying—and you get them *both* from this combination. Your Roebling Electrical wholesaler is doing a great job, even with all the trials and tribulations of increased demand and limited supplies. Your Roebling Field Engineer is qualified by "Know What", and "Know How" to consult and advise on specialized problems.

You can always turn with confidence to your local Roebling Electrical Wholesaler.

JOHN A ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
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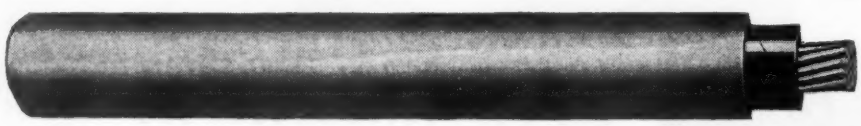
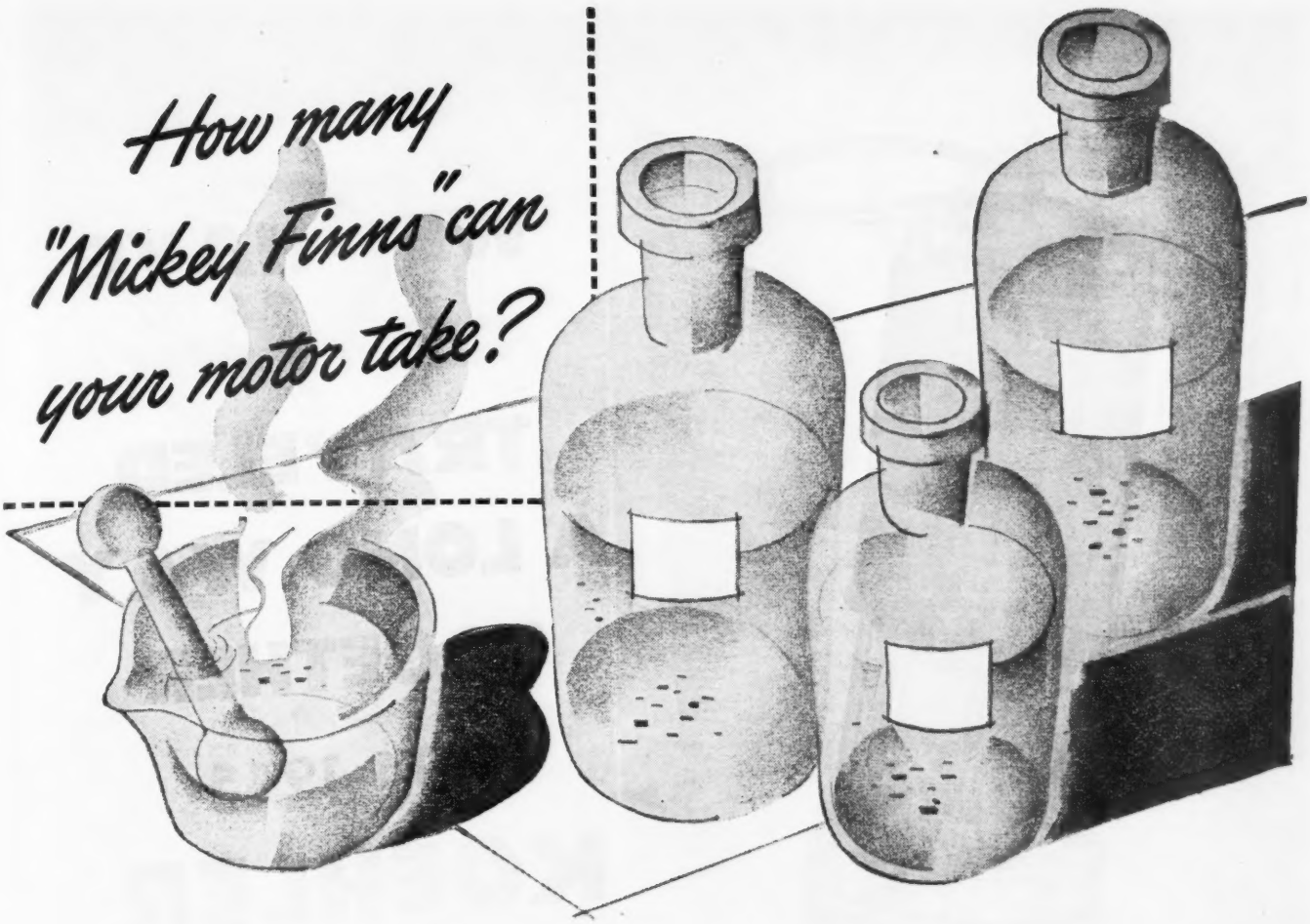
WIRE ROPE AND STRAND • FITTINGS • SLINGS • COLD ROLLED STRIP • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • SUSPENSION BRIDGES AND CABLES • WIRE CLOTH AND NETTING AERIAL WIRE ROPE SYSTEMS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS

JAR ROEBLING



PACEMAKER IN WIRE PRODUCTS

How many "Mickey Finns" can your motor take?



Corrosive acids, heat, moisture, dirt, overloads and the human element can all give knockout drops to even the best designed motors — motors designed by experts to do a specific job — motors built to operate economically, give maintenance-free service.

Without such motors, the war production of American industry would not have been possible. Yet, records show motor failure still imposes heavy time and dollar loss on nearly every concern in every industry.

Fiberglas* Electrical Insulation Materials have proved their ability to protect motors from the conditions which cause a majority of failures. They provide that "extra" protection which assures a decrease in down time and consequent production losses.

Fiberglas Insulation cuts rewind shutdowns

The experience of a Michigan manufacturer is typical of benefits obtained from Fiberglas Insulation:

Main power boiler blower fans are located on top of the boilers, operating at high ambient temperature, with cooling air for the motors carrying considerable acid and chemical fumes. The average periods between rewinds was from six months to one year.

Then a Fiberglas-insulated motor was installed. Except for one short period, it has operated continuously since February, 1938. After four years of service, the motor was tested. Megger readings were high, indicating the excellent condition of the insulation. The motor was blown out with steam and reinstalled.

And remember, the only added cost in rewinding with Fiberglas is the slight difference in insulating materials.

Fiberglas Electrical Insulation Materials, in plain and treated forms, are available *now*. For complete information, consult your distributor or write us for new catalog. *Owens-Corning Fiberglas Corporation, 1862 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ont.*

* * *

BE SURE TO SEE THE FIBERGLAS ELECTRICAL INSULATION MATERIALS EXHIBIT

THE NEXT SHOWINGS ARE: Netherlands Plaza, Cincinnati, March 13-15; Henry Grady Hotel, Atlanta, March 20-21; Tutwiler Hotel, Birmingham, March 27-28; Jefferson Hotel, St. Louis, April 3-4-5-6; Muehlebach Hotel, Kansas City, April 17-18. Locations of showings in Dallas, April 24-25, Houston, May 1-2, and appearances in other cities will be announced later.

ASK FOR FIBERGLAS—IN YOUR NEXT NEW MOTOR—AND ON YOUR NEXT REWIND

FIBERGLAS *T. M. Reg. U. S. Pat. Off.

ELECTRICAL INSULATION MATERIALS

ARMY E NAVY

THERE'S A COMPLETE LINE OF FIBERGLAS ELECTRICAL INSULATIONS

YARNS • TAPE • CORD • SLEEVING • CLOTH AND OTHER FORMS. Also available in: Magnet wire, Lead wire, Special wires, Varnished cloth and tape; Mica combinations: Laminates, Saturated sleeving, Varnished tubing, Pressure sensitive tapes, Special products.

WE HAVE *Safely* TRAVELED A LONG WAY TOGETHER

1914-1945

KOEHLER

FLAME SAFETY LAMP

The Koehler Flame Safety Lamp is fully approved by the United States Bureau of Mines — it has a perfect rating. Write today for new folder "Use and Misuse of Flame Safety Lamp."

EFFICIENT • POSITIVE LOCKING DEVICE •
LATEST TYPE IGNITER • RUGGED CONSTRUCTION

WHEN YOU USE KOEHLER YOU USE THE SAFEST

Write today—

WHEAT LAMP SALES, INC.
1501 Kanawha Valley Bldg.
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KOEHLER MFG. CO.
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SPECIALISTS IN MINE LIGHTING FOR 30 YEARS

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OLDHAM & SON, LTD.
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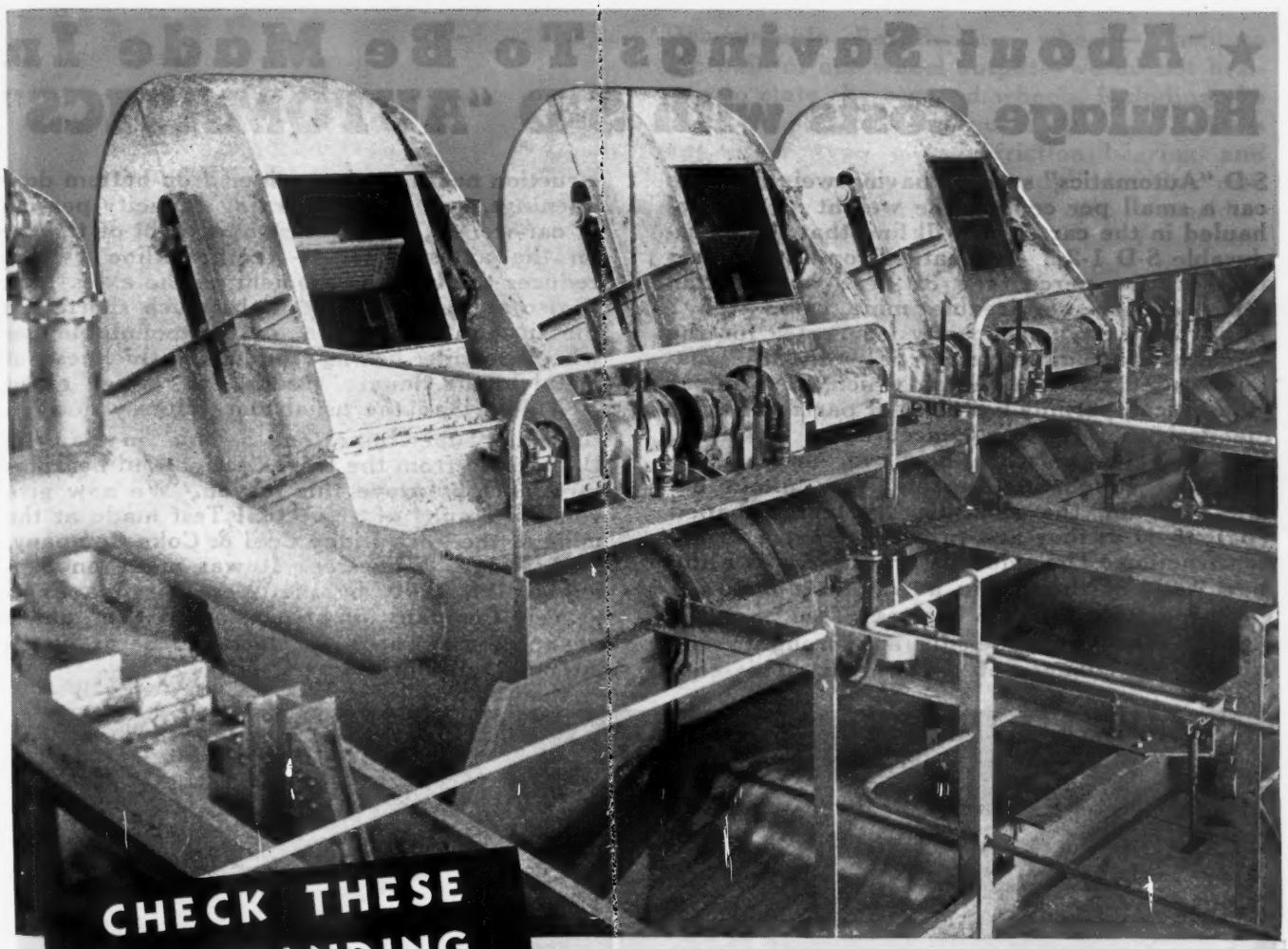
ALSO MANUFACTURERS OF THE WHEAT APPROVED ELECTRIC CAP LAMP



CHECK THESE OUTSTANDING FEATURES IN Jeffrey AIR-OPERATED COAL WASHER

(PATENTED)

- ☐ Differential stroke controlled by a Rotary valve.
- ☐ Parallel flow of coal and refuse.
- ☐ Slope of screen plate readily adjustable.
- ☐ Streamlined "Educated Fish" float that overcomes turbulence in the bed.
- ☐ Completely automatic.

THE JEFFREY MANUFACTURING COMPANY

912-99 North Fourth St., Columbus 16, Ohio

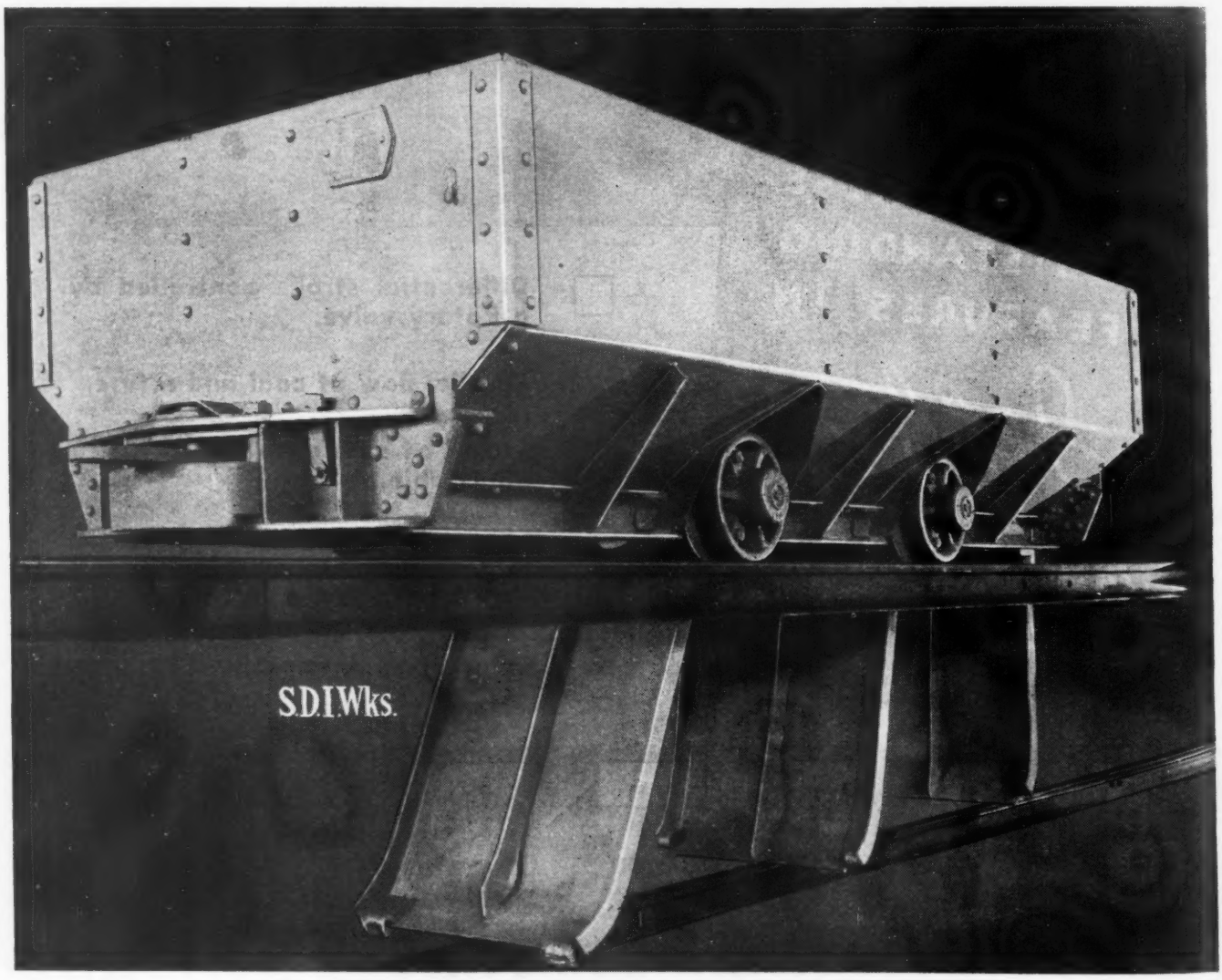
ESTABLISHED 1877

Baltimore 1 · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 13 · Denver 2 · Detroit 13 · Harlan · Houston 5 · Huntington 19 · Milwaukee 11 · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 3 · Salt Lake City 1 · Scranton 3

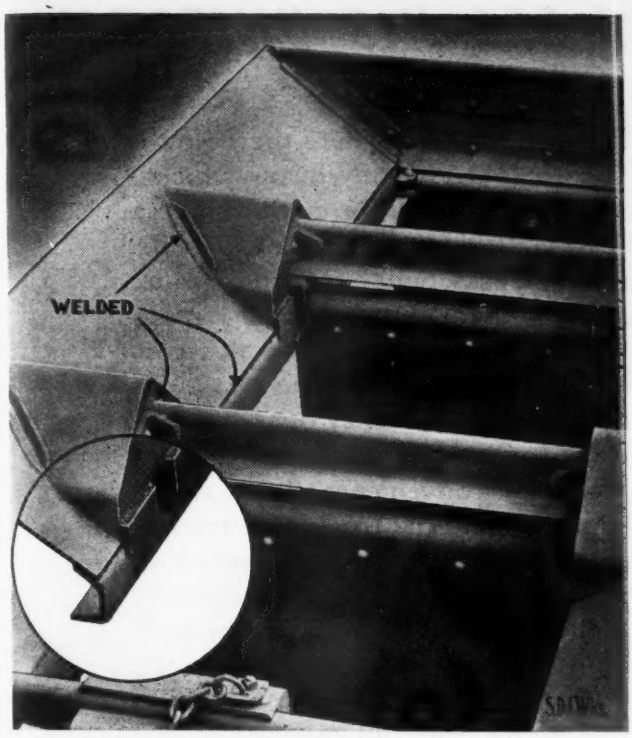
★ About Savings To Be Made In Haulage Costs with S-D "AUTOMATICS"

S-D "Automatics" save by having weight of the car a small per cent of the weight of the coal hauled in the car. You will find that the extra-durable S-D 1-2-3 Automatic Drop-Bottom cars have a less percentage of dead-weight than other equally serviceable mine cars. Why? First, the carrying capacity is greater for the same over-all dimensions. Secondly, the materials used are of a quality which, in so far as is practical, permits lightness of parts. Thirdly, the design of the car "encourages" lightness. For example, the wheel-hoods on our cars are extended supporting gussets, (see photo below). Again, the side-sills, by being shaped (patented) as they are, provide an extra strong construction. The side-sills are tied in with the side walls of the car in a way that makes a girder out of the whole business, (see photo at right). Also, the side-sills are brought very close to the flanges of the wheels. This construction not only gives wider drop-bottom door openings, and larger carrying capacity per ton of car-weight, and brings the weight of the car on the axles closer to the trackline (which reduces the bending moment on the axles), but it also makes the wheel hubs much shorter on the inside. Therefore, our demountable car wheels, while having the usual thickness of metal in the flanges, treads, etc., weigh about 10% less than the usual more clumsy designs.

But, the Super-Important Savings in Haulage Costs come from the wheel design and bearings used. Let us prove this to you. We now give you the results of an Actual Test made at the mine of the Fork Ridge Coal & Coke Company, Fork Ridge, Tennessee. It was made on September 14, 1940, by the West Virginia Engineering Company, of Charleston, W. Va., under the supervision of A. C. Harris, General Superintendent of Fork Ridge.



Sanford-Day Iron Works. KNOXVILLE, TENNESSEE



Demountable Ball-Bearing wheels constitute the bulk of our wheel output—we do not hesitate to state these grand wheels, including the bearings, stand the service at least as well as any other type of anti-friction bearing and wheel that we have ever supplied. Our estimate really is that the repair cost is considerably less with the S-D "Floater" Demountable Ball-Bearing wheels. Not only this, but both wheel castings and ball-bearings carry our written guarantee for 5 years of normal service, and we also guarantee that where the wheels do not run under water they will run 40,000 miles with only one thorough mine-lubrication after the factory lubrication. That is to say, they will run 8 to 10 years of normal one-shift-per-day operation, and with only one extra lubrication at the mines.

PLEASE NOTE

A Complete Report of the Test Made at Fork Ridge by the West Virginia Engineering Company will be sent on request.

Copies of our guarantees on wheel-wear, on ball-bearing wear, and on lubrication requirements, will be sent on request.

RESULTS SUMMARIZED

As taken on 10-car hauls, on round trips equalling 1.978 miles, on grades "out" averaging .46% downhill, maximum 4.0% and maximum upgrade coming out 1.2%.

ELECTRICITY SAVED

Saving of Electricity per car per year, $5.51, or $82.65 per car during 15 years. This saving is based on electricity costing 1½ cents per kilowatt-hour, and on the car traveling 5000 miles per year.

TIME SAVED

Time Saved—8.97% of total time of trip.

HAULAGE CAPACITY INCREASED

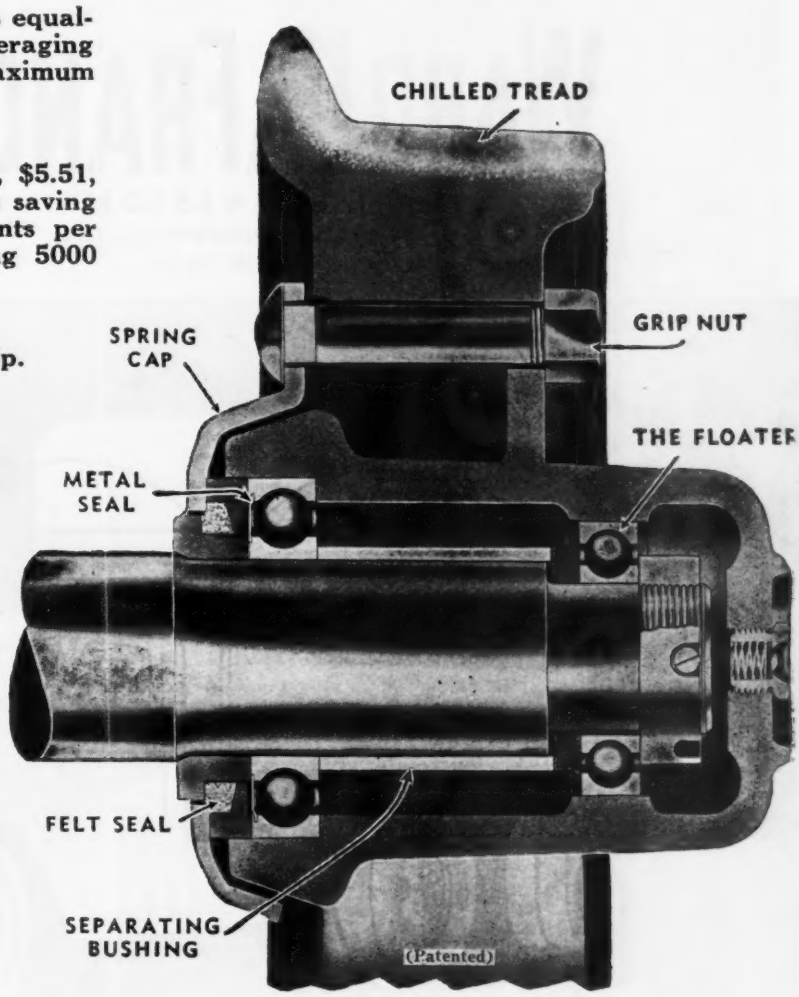
Increase in Effective haulage capacity of electric locomotive 49.5%.

HOW WERE THESE IMPORTANT SAVINGS MADE?

Answer: By using S-D "Floater" Ball-Bearing Demountable Wheels on the cars which proved so efficient as compared to a non-demountable design of wheel equipped with another type of anti-friction bearing on the other cars which were similar in other respects.

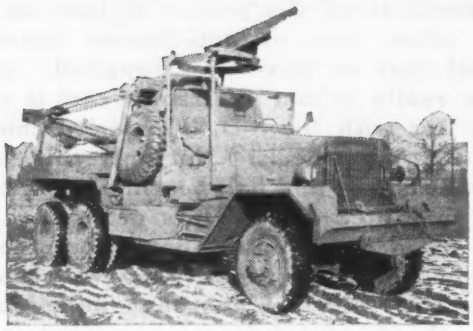
HOW ABOUT THE SERVICE OF S-D "FLOATER" BALL-BEARINGS?

Answer: After more than 18 years experience with our Ball-Bearing wheels in all sort of service—one year 86.86% of our wheels were of the S-D "Floater" demountable Ball-Bearing type, and every year the S-D "Floater"



Sanford-Day Iron Works. KNOXVILLE, TENNESSEE

WHEN "BIG BOY" TAKES OFF HIS UNIFORM



● All over the world, where the going is toughest, the M1A1 Army heavy wrecker has earned its reputation as the biggest, toughest, pullin'-est bruiser on wheels. These super trucks, built by Ward LaFrance Truck Division for the Ordnance Department, are used for such jobs as tank recovery, motor vehicle rescue, lifting and carrying disabled bombers. They operate in the mire of European swamps . . . the muck of Asiatic jungles. To the M1A1 wrecker, a road is a convenience, rather than a necessity . . . In the near future, Ward LaFrance commercial trucks and tractors will again appear on America's highways. These Ward LaFrance over-the-road trucks and tractors are designed to haul pay loads faster and more economically than ever before. They are not streamlined like a sport coupe, but they look like what they are: the biggest, toughest, sturdiest motor trucks on the highway. They are backed by the twenty-five year Ward LaFrance reputation for building great trucks, further proved by unbeatable performance all over the world.

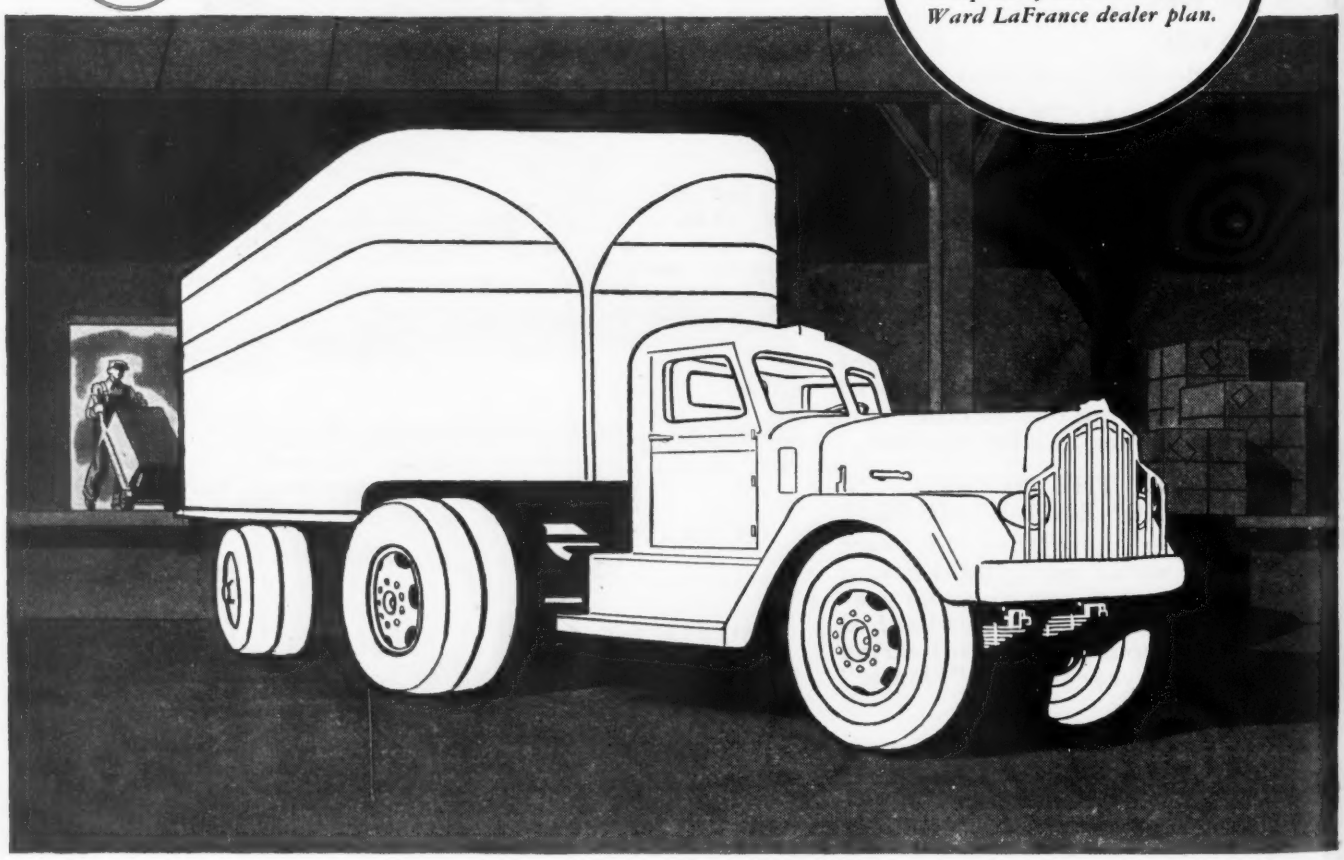
WARD LAFRANCE

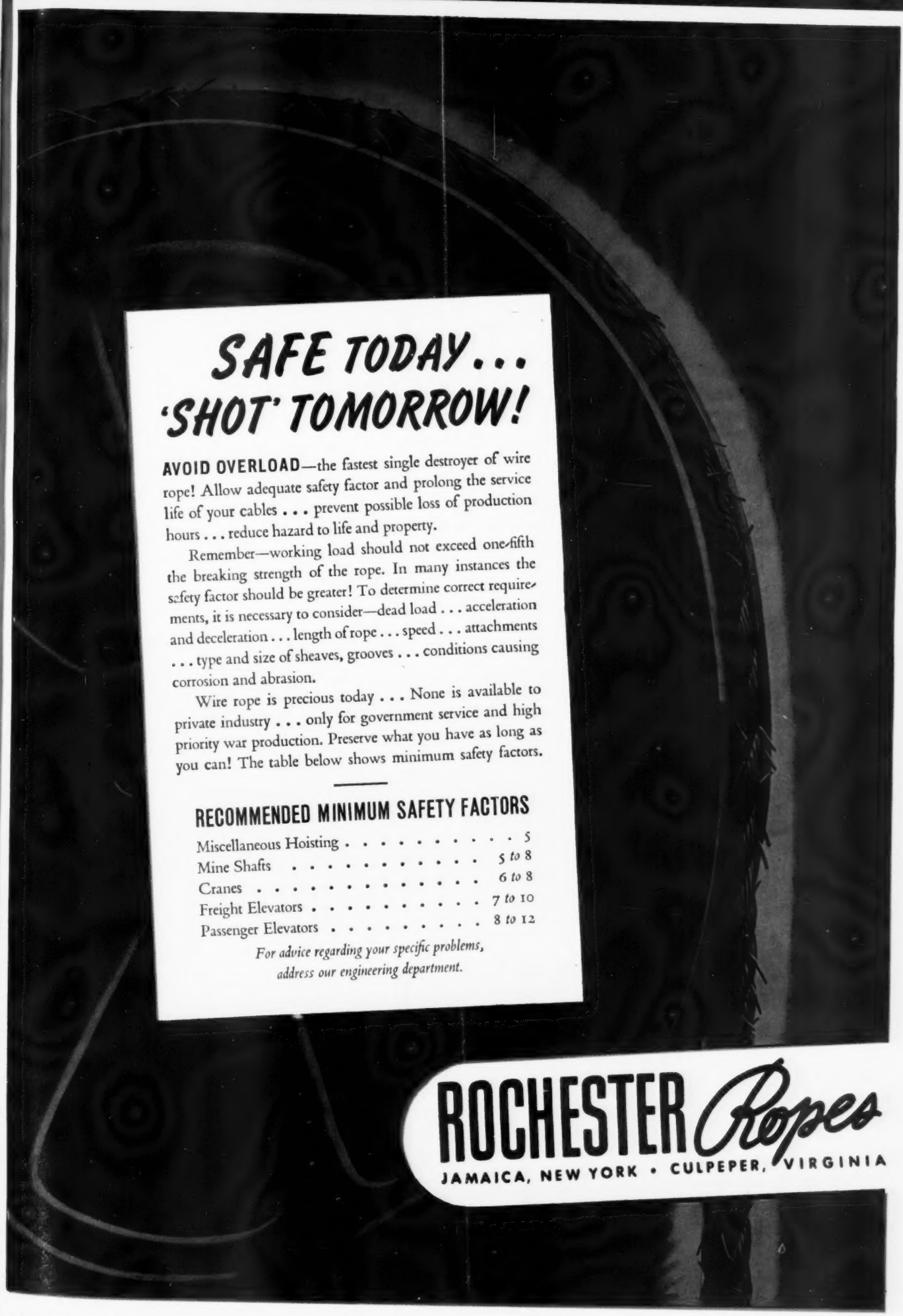
TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA • NEW YORK

FRANCHISES ARE AVAILABLE
to alert dealers in a number of attractive territories. Leading dealers now handling smaller, non-competitive trucks will be especially interested in the Ward LaFrance dealer plan.





SAFE TODAY... 'SHOT' TOMORROW!

AVOID OVERLOAD—the fastest single destroyer of wire rope! Allow adequate safety factor and prolong the service life of your cables . . . prevent possible loss of production hours . . . reduce hazard to life and property.

Remember—working load should not exceed one-fifth the breaking strength of the rope. In many instances the safety factor should be greater! To determine correct requirements, it is necessary to consider—dead load . . . acceleration and deceleration . . . length of rope . . . speed . . . attachments . . . type and size of sheaves, grooves . . . conditions causing corrosion and abrasion.

Wire rope is precious today . . . None is available to private industry . . . only for government service and high priority war production. Preserve what you have as long as you can! The table below shows minimum safety factors.

RECOMMENDED MINIMUM SAFETY FACTORS

Miscellaneous Hoisting	5
Mine Shafts	5 *to* 8
Cranes	6 *to* 8
Freight Elevators	7 *to* 10
Passenger Elevators	8 *to* 12

For advice regarding your specific problems, address our engineering department.

ROCHESTER *Ropes*

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

JOY

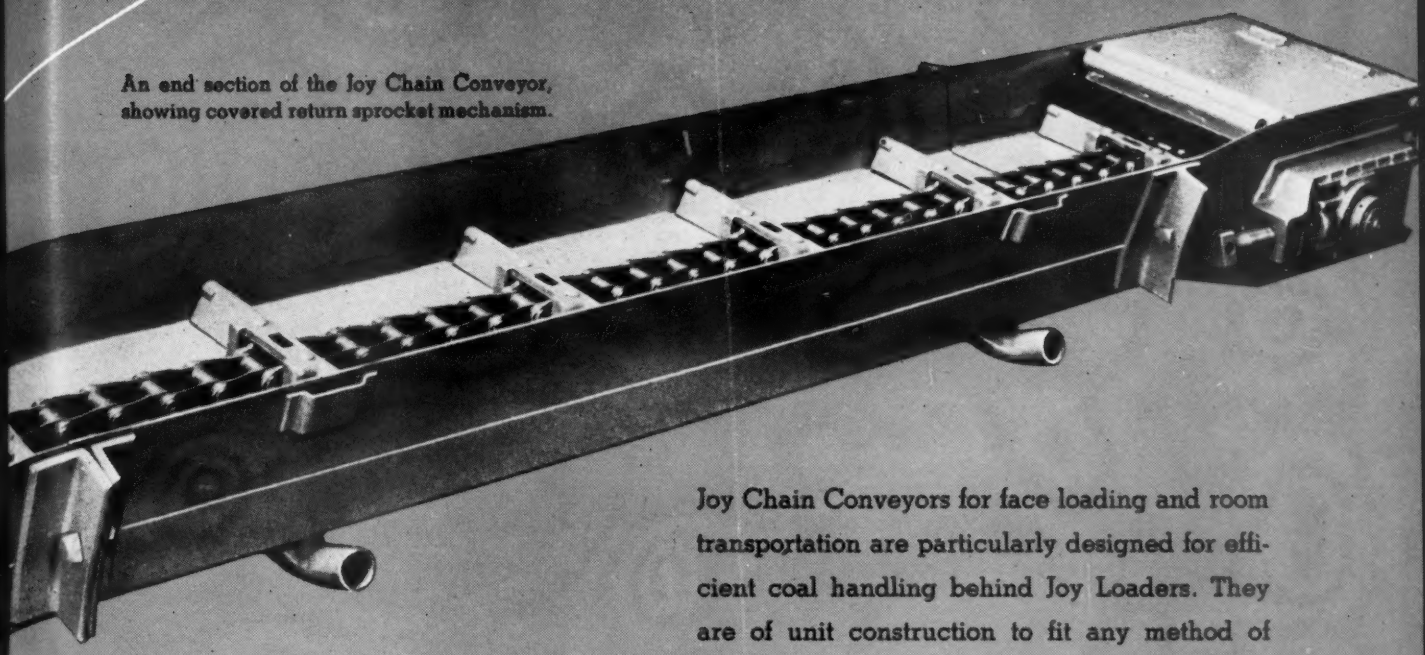
CHAIN AND BELT CONVEYORS

give you smooth, fast quantity haulage.

COMPLETE SELECTION OF CHAIN WIDTHS AND MOTORS TO CARRY YOUR HEAVIEST LOAD ECONOMICALLY

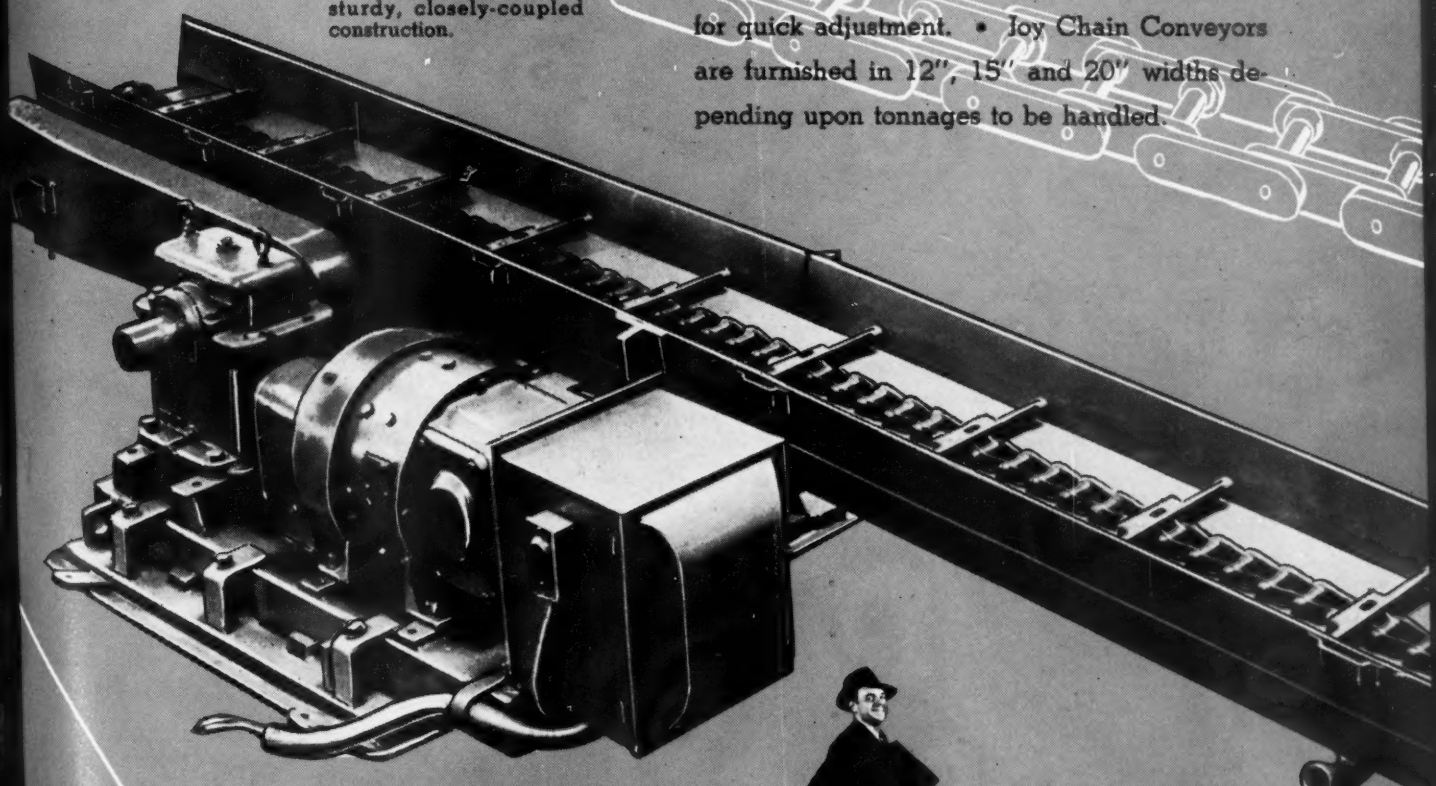
Working in coordination with Joy Chain Conveyors, a Joy Belt Conveyor, such as the one pictured below, can greatly speed tonnage output, lower production costs.

An end section of the Joy Chain Conveyor, showing covered return sprocket mechanism.



Joy Chain Conveyors for face loading and room transportation are particularly designed for efficient coal handling behind Joy Loaders. They are of unit construction to fit any method of mining. • Driving units are available in various motor sizes fitting maximum conveyor lengths at different gradients and desired tonnages per hour. • Perfect alignment of motor, speed reducer, chain and conveyor sprocket are maintained by mounting on a rigid base. • Take-up is accomplished by means of heavy thread bars for quick adjustment. • Joy Chain Conveyors are furnished in 12", 15" and 20" widths depending upon tonnages to be handled.

View of motor and driving end of conveyor shows sturdy, closely-coupled construction.



JOY MANUFACTURING CO.
FRANKLIN, PA.

Call in a Joy Engineer

PHOTO IN IRON MINE

SAFETY is the Watchword!

Square and clean is the way to cut it. Use a sharp knife or bench cutter.

Always seat the fuse snugly in the cap to avoid misfires.

Firm crimping is needed to hold the cap and fuse together securely.

Exactly in the center of the primer cartridge is the safest place for the cap.

Tying is vital if the fuse and cap are not to slip out of place.

You won't have to run if you don't short-fuse — give yourself time!

It's common sense and good practice to do the job right the first time — you might not get a second chance. Misfires, delayed or burned holes are costly and dangerous. Avoid them by always making proper use of dependable Ensign-Bickford Safety Fuse.

S-13

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Since 1836
Also Primacord-Bickford Detonating Fuse

ENSIGN-BICKFORD *Safety Fuse*

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor* **APRIL, 1945**

Opportunity Lost

THE COURSE of the bituminous wage conference at the first of April once more was leading to the conclusion that the New Deal and Lewis were again working their familiar squeeze play. There was no sign of recession from the stand-and-deliver technique that has been employed through the years by Lewis and his federal supporters to the detriment of real labor relations in coal mining.

Looking back, one thing stands out: the loss of opportunity for really advancing cooperation between miner and operator. When Lewis rode back into power in 1933 on Roosevelt's coat tails, the stage was set for achieving the community of interest that should be the prime goal of miner, operator and government. For failure to reach that goal the lion's share of the responsibility rests on the New Deal and Lewis. Instead of cooperation, Lewis' ambition has impelled him more and more to the tactics he is fond of charging against the operators: unreasonableness, refusal to bargain and disregard for the interests of the industry.

Recital of faults and failures, however, is only part of the answer to the question of achieving harmony. In the last analysis it turns on real understanding of what cooperation means and how it can be achieved. The public and through it the Congress has the last word. Although management has had plenty to dishearten it and the road still is steep and rocky, it also has the most to lose. The actions of union leaders may in themselves provoke a revolt but the best way still remains intensification of public and employee relations work and representations to Congress. When these bring about the quality in treatment now sadly lacking in governmental actions the first step will have been taken toward the goal of benefit to all.

Still a Way Out

COAL'S recent production record made inevitable the tightening of distribution controls and the further restriction of retail deliveries announced in March and supplemented by preparation of a priority list for use if, in the opinion of government agencies, future developments warrant. Although necessary if output maintains no more than its present level, restrictions in consumption nevertheless present coal with a real problem if it is to avoid undue and unfair criticism from disgruntled users. While preaching the gospel of conservation, operators also will need to put increased effort behind the job of informing consumers of the real situation and retaining their good will.

There is, however, another aspect to the situation. If production were ample, restrictions would be unnecessary. Admittedly this is easier to talk about than accomplish, although recent manpower developments make the picture a little brighter than it was a few weeks ago. But have all the possibilities of better utilization of mining manpower been exhausted? Few would say that they have, and in that direction lies a real opportunity for the industry. Every one-tenth of a ton increase in output per man-shift would mean, barring stoppages, over 2,000,000 tons of anthracite and 10,000,000 tons of bituminous coal in 1945. Management is the key and now is the time really to concentrate on efficient production methods. The rewards were never better.

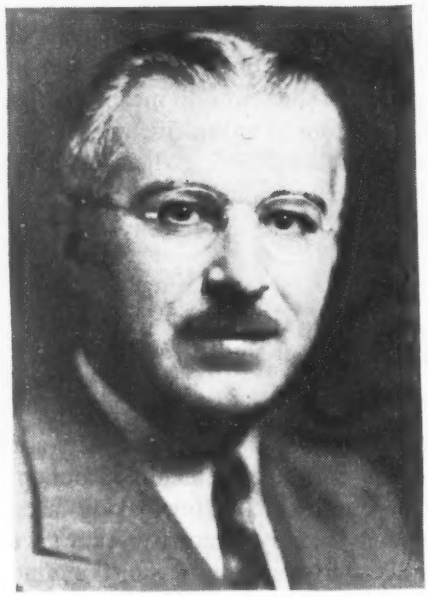
Half by 1950

THE AVERAGE coal mine of the United States is a safer working place now than it was three years ago despite critical manpower shortages, difficulty in obtaining equipment and production at history-making rates. In pointing out that fact recently, Secretary Ickes gave credit to the "increased safety consciousness of the mine operators, a growing realization of workers that safety depends upon their assistance in preventing accidents, orders and suggestions given operators and workers by State inspection forces and recommendations made by inspectors of the Bureau of Mines."

Satisfaction with public recognition of their part in the improvement should, however, serve only to spur coal men on to even greater achievements in preventing loss of life, limb and property. Their part in the war record is a real and praiseworthy one and leads on to greater progress in the future. Halving the 1944 rates of approximately 1.8 fatalities per million tons in bituminous and 2.7 in anthracite by 1950 would seem not at all unreasonable in view of achievements in the last five years. In fact, coal might well set its sights even higher. The results in public good will and reduced coal cost amply repay concentration on that vital objective.

Helping the Supervisor

IN HIS KEY JOB IN MINING



The supervisor is the main and often only contact between company and employee. To function properly in his key role, he must therefore know company aims and policies, how to produce safely and efficiently and how to deal with personnel. Here is one company's program for giving supervisors the facts and techniques enabling them to discharge better their major responsibilities.

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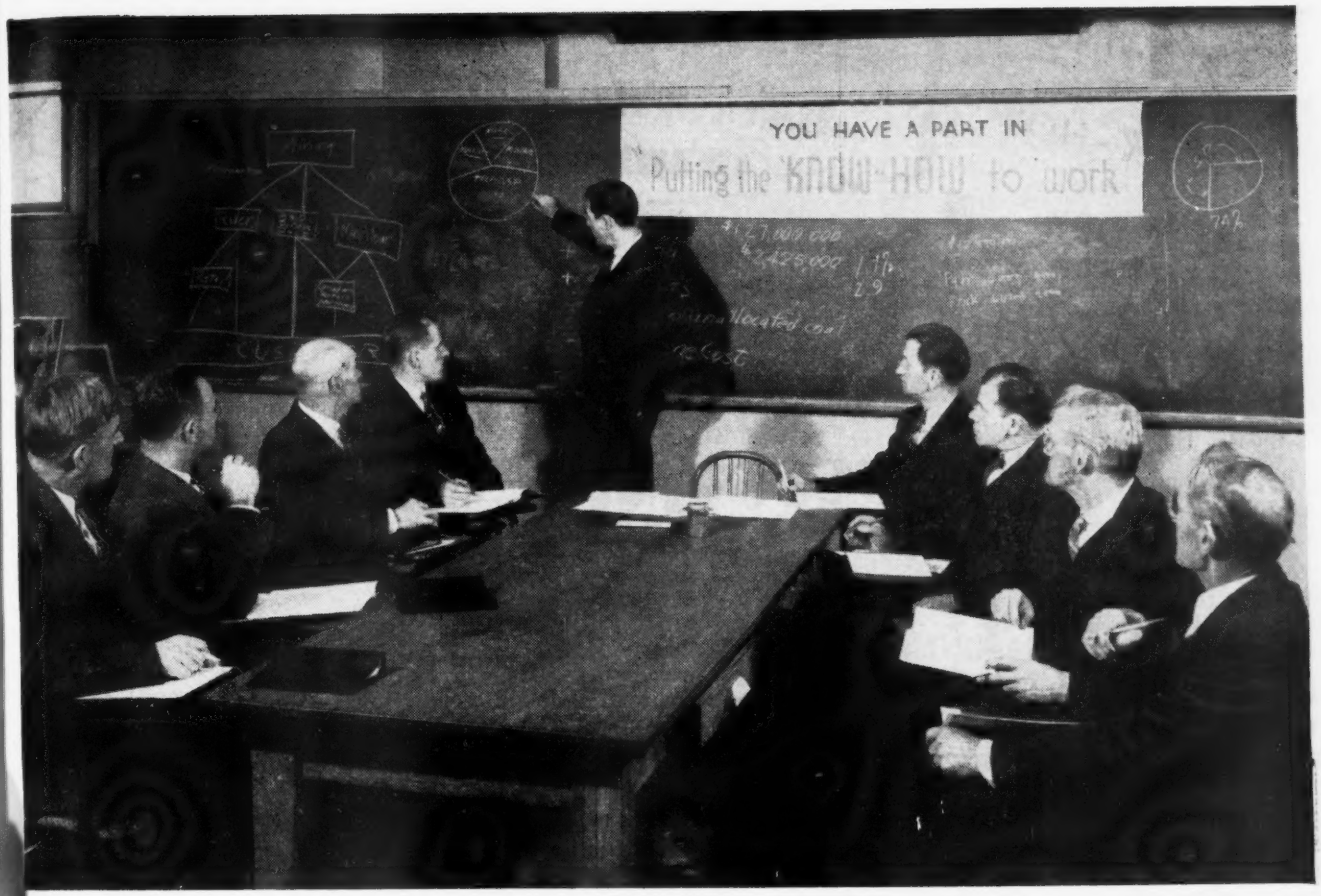
A firm belief that management and men have a common responsibility and a common goal in industrial achievement guides R. E. ("Ray") Charlier in his daily work. He started with the Pittsburgh Coal Co. as a junior pay clerk in August, 1906; became chief clerk in 1909 and went into the general offices of the operating division in 1914. From 1916 to 1938 he was assistant chief of mine clerks in the operating division and from 1938 to 1940 worked with the standards department in formulating and administering a standard cost system. He embarked on his present work in November, 1940, as assistant to the industrial relations manager, becoming relations manager the following month.

TODAY the "underground" means more than mining. For a long time now we have been reading and hearing about the underground in Europe. The most interesting accounts of its formation and activities in the war theatres, in most instances, have dealt with how patriot members overcame the difficulties of communicating with one another. There were two things they could do only with great difficulty, which should hold a lesson for those of us interested in mining: (1) They could not meet in large groups; (2) they could not communicate openly. They succeeded because they were individualists *with an objective.*

In our working relationships with miners we must recognize that we are dealing with individualists also. In addition to natural conditions, methods of payment and operator practices, other age-old mining customs have helped to develop this individualism. The miner walked to work. He arrived at an approximate starting time and there were no time clocks to punch. He stopped work when he felt like it. Little or no attention was paid to absences from work. Prior to the establishment of mining laws and awakening of a sense of responsibility on the part of mine operators for the safety of their employees, many miners worked for days and in some cases weeks without seeing a supervisor. All this certainly would tend to give the miner a feeling of direct responsibility for his own safety and earnings.



Program and technique are dovetailed to make the Pittsburgh Coal Co. conferences yield the most in help to supervisors in their operating and labor relations problems and in acquainting them with company aims and policies. The program is designed to put "Know-How" to work and the sessions are held at operating headquarters.

Enactment of safety laws brought about a need for additional supervision. The supervisor felt that primarily his chief responsibility was to see that the miner worked and the various operations were conducted safely. This meant that when the supervisor came into the miner's working place his first thought was to see if anything was wrong. Such a situation, with the meager training given supervisors, could not and did not develop good relations between the company, as represented by the supervisor, and the worker. The miner saw the company representative once or twice each shift and knew if anything were wrong it would be forcefully called to his attention.

Without proper training in how to

PUTTING THE "KNOW-HOW" TO WORK

What Pittsburgh Coal's Five-Day Conference Offers Its Mine Supervisors

FIRST DAY

Purpose of the Conference ..... *Production Manager*
Company Finances ..... *Assistant to the President*
Qualities Which Make a Leader.... *Industrial Relations Manager*
Explosion Prevention ..... *Safety Director*

SECOND DAY

Production Methods ..... *Production Engineer*
Trip to Pittsburgh and visit to general offices.
Lunch with president of company and other officials.
Planning the Job..... *Mining Engineer*

THIRD DAY

Industrial Relations for the Supervisor.. *Industrial Relations Mgr.*
Trip to Pittsburgh for ball game, movie or theater (afternoon).

FOURTH DAY

Markets and Customer Needs..... *Product Control Manager*
Lubrication ..... *Maintenance Engineer*
Preparation Practice ..... *Product Control Manager*
Job Instructor Training .... *Asst. to Industrial Relations Manager*

FIFTH DAY

Accident Prevention ..... *Safety Director*
Foreman's Part in Community Relations.....
Public Relations Counselor
Foreman's Part in Maintenance..... *Maintenance Engineer*
Panel Discussion (afternoon).

Built around the theme that the "the best labor relations program a company can have is good supervisors," the Pittsburgh Coal Co. conferences employ a number of manuals, bulletins and notebooks to help put over production, preparation, safety and labor relations ideas. Samples shown here are typical.

establish workable relations with the miner most supervisors treated all workers alike. There was the law; it had to be obeyed and the supervisor was the "policeman." His chief function was to tell the worker "Don't" and the worker developed a feeling that to follow all the instructions of the boss would slow him down and interfere with his earnings, while the foreman got to thinking that he was responsible only for a limited portion of the duties of management. So, he naturally developed into a sort of safety inspector.

Summing up, here was management's representative with a chance to see his workers only a few minutes during the working shift and feeling that in those few minutes his main job was to find fault. How did that come about? First, there was the mistaken notion that the only thing needed to make a foreman was to have some ambitious worker study hard and pass the required examinations and, second, the notion that all the training he needed was a few days on the mine section with another foreman.

The supervisor was expected to be the buffer between management and the worker. He could not be censured if he felt that mine management was something for which he was working, not something of which he was a part.

This of necessity developed a critically negative attitude on the part of the foreman, and the effects of this attitude were felt in the whole industry. This feeling was enhanced because many times he was charged with the responsibility for results without commensurate authority. This too was a result of the underground. Top management hesitated to give full authority where opportunity for communication was limited. Under those circumstances, how could the industry expect to establish a feeling of mutual trust, consideration and respect?

Not Alone the Supervisor

If we are going to look into the background of our labor troubles in mining we certainly cannot blame the supervisor for all of the mistakes he may have made or is now making. The underground supervisor of today cannot be taken to task if he is the victim of a system which has not fully overcome its heritage or if he is part of a management which has not recognized the supervisor's position of importance in the mine organization.

While we are examining some of the background which may be responsible for part of our labor difficulties today we must be clear in our thinking about our employees as organized workers. There is no real reason why production workers being organized should make very much, if any, difference in the relations of employer and employee. In many unions the strategy is to create a management vs. employee conflict, the purpose being to impress the worker with his need of the union. It is difficult under such circumstances to establish a feeling of mutual understanding with the worker.

Because of the shortsightedness of some of those in industry and some labor leaders; the narrow margin of profit in the coal industry over many years; the large proportion of coal cost represented by wages; and certain early practices on the part of some operators in the handling of company stores, company doctors and other matters, we can say truthfully that both the worker and management must share the blame for any suspicion, distrust and discord which exists today.

Those, in brief, are some of the inherited difficulties under which we are mining coal in 1945. The fact we are doing our work over large areas of the underground makes our problems a little harder but we believe they will be solved eventually.

A discussion of the solution to our problems might start with a summary of what they are:

1. We are dealing with individualists.
2. Our supervisors have not been given the training necessary for their jobs.
3. We need cooperation between management and the union.

Many of our difficulties have come from the fact that we developed the miner's independence in his work and then treated him as one of a class in housing, stores, medical care and other matters related to actual operation.

The miner always has resented being set in a class by himself. Perhaps this resentment was not well articulated and perhaps he did not always understand it himself but still it created a gulf of misunderstanding between him and his employer.

Individuals the Keys

One of management's first jobs is to learn to deal with the employee as an individual instead of as a member of a class or as a jobholder. Miners may not be egotists but many are proud to the point of egoism in their occupations. An element of courage is required to spend one's working hours in the dark recesses of the earth. The miner recognizes this. The wide publicity given to injuries, whether or not they are fatal, has put coal mining in a place in our industrial economy different from that of any other occupation.

This being true, how careful management must be not to cheapen the position the miner feels is rightfully his! Yet many of the practices of the industry have tended to minimize his importance.

Let us forever remember that the miner is an individual—a proud individual who is placed on his own much of the time he is at work. Because of his isolation from other workmen underground he has a lot of time to think and if we knew what he was thinking we would know better how to win his cooperation. It behooves us, therefore, to listen when he wishes to talk with us. Whether it be to ask a question, offer a suggestion or present a real or fancied wrong; whatever it is we may be sure it is important to him. We must heed what he says. He feels his job is important enough to him to warrant a hearing.

Our future relations with employees will depend in great measure on how sincerely we feel they are important to us. If we sense that importance and in our relations with them let them know it, we will at least have started on the road to winning that respect and confidence so necessary to build a cooperative organization of labor and management.

There is yet another problem to be solved which seems the very opposite of that previously stated. While the miner must be respected as an individual and our supervision must show this respect, we must somehow be able to create an awareness on his part of the mutual benefits of unity and cooperation in the entire working organization. Because of the scattered and isolated location of underground working places, this probably is the most difficult problem to be solved. In a surface plant where employees are in almost constant contact with each other and with management a "plant" spirit is much easier to develop than in the underground.

Use of bulletin boards and public address systems to outline, carry forward and announce results of common objectives to be attained make the inauguration and operation of such plans quite simple in a surface plant in comparison with a mine. During the war, it has been especially difficult to arouse in a mine organization the degree of enthusiasm necessary to attain the results in cooperation and production it was reasonable to expect—not because miners are less patriotic but primarily because the work they are doing is exactly the same as in peace time and management has been handicapped by limitations on opportunities for reaching the workers in groups. It is quite apparent that enthusiasm can be aroused in a group much more easily than by individual solicitation.

Letters and other literature to each employee will help some in developing a group consciousness among miners. Sectional and mine comparative data on safety, attendance and production also will help to stimulate a feeling of group effort and accomplishment. The fact remains, however, that to date our own company has not discovered any method of instilling in the mind of the miner a distinct feeling of belonging to a group that is trying to reach a common objective. The reason primarily is inability to overcome the isolation of the individual worker.

Some might ask "Why not have meetings aboveground?" Our company has public address systems on the surface at every mine. Meetings are held between shifts at least once each month for making safety awards, but this does not accomplish the purpose in question. Evening meetings have been tried with motion pictures as the main, and sometimes only, attraction. The attendance at such meetings has not warranted their continuance.

Making Supervision More Effective

Analysis of the situation leads to the conclusion that part of the responsibility for developing a cooperative attitude on the part of the worker must be placed on the immediate supervisor and management must accept the entire blame for not developing foremen for the face who recognize the need for team work between worker and management. Carrying this thought a little farther, what has been the greatest fault of top management in all industry in its attitude toward the foreman? Let us be honest with ourselves. The foreman was not accepted as a part, and a very important part, of management. His whole development led him to feel that he was the buffer between management and the worker. He developed a fighting attitude. He was always "in the middle." Top management did not take him into its confidence. Very often—in fact most of the time—union officials knew more about some policy changes than did the foreman.

What has been developed over the years in coal mining was, as previously stated, not a supervisor—not an integral member of our management team—but a safety inspector. Suddenly it became apparent that this kind of supervisor was not going to be effective, particularly in mechanized mining. Management also began to become aware that had the same type of service been given the hand loader that was later accorded mechanized mining sections greater production per man no doubt would have been achieved. Further, there gradually developed in management a realization that maximum use was not being made of the abilities of the employees and that there was a very definite step to take: make the supervisor a real part of management in fact as well as in name. This could not be done as an expedient. It had to be done honestly and sincerely. It would not and did not have much effect to *tell* the supervisor he was a part of management. Sincerity of purpose had to be proved to him by making him an active part of management.

The first step was to give him the authority to do the job for which he was responsible. Here we again faced some difficulties because we were underground. The face supervisor obviously cannot do the employing simply because he cannot be seen by the applicant for the job. But he can say who is to work in his section and what he is to do while there, discipline workers for failure to conform to accepted standards and practice, settle grievances and discharge workers within the limits of policy.

In the exercise of these prerogatives of management the face supervisor cannot always be relied upon to use his own judgment. This implies no

doubt of the supervisor's ability but in an operation where hundreds of men are employed it is necessary to have accepted practices which are reasonably uniform. Consequently the supervisor must know the practice of the whole group before he can take action. These are limitations imposed by the difficulties of communication with the next level of supervision. Again we see how plant organization is hampered by being scattered underground.

Another very important step which had to be taken, now that the supervisor had authority to act, was to give him some one person to whom he would be responsible. Orders or instructions must come to him from his immediate superior only. In our company this means that all staff departments such as safety, product control, engineering and industrial relations in their dealing directly with the foreman, or others in the line organization, act *only in an advisory capacity*. They issue no instructions with a "must do" attached to them.

How to Help?

To be fair to the supervisor, he had to be prepared for full acceptance of his responsibilities. Giving him authority to act meant that he had to know company policies and practices. When he was charged with the responsibility for safety, personnel, equipment, supplies, quality of product and production there were many things he needed to know. How could this knowledge be imparted to him?

Again we were faced with our underground conditions. We could not, as in a surface plant, announce over the public address system that there would be a meeting of all foremen in the assembly room at 10 a.m. As a result meetings were held before and after the shift when time was limited and the foremen had other things on their minds. Instructions were hurried, there was little time for discussion and the subjects discussed were, as a rule, the immediate operational problems. Many such meetings degenerated into what the men called "hell-raisin' sessions."

A better plan employed by some companies was to take the men off the job and hold a staff dinner. This provided an opportunity to present and discuss all types of subjects pertaining to the industry, the company and to their own immediate problems. The program helped but there still remained many topics which could have been discussed with profit had there been more time.

Some mines are holding "five-minute meetings" for all supervisors each day at the end of the shift. This conserves time, since many instructions for the next day's operation, new policies or procedures, requests and other details affecting the group usually can be presented within the five-minute period when it is done every day. It is important, however, that these meetings be strictly limited to no more than five minutes.

Another type of conference which our mines have found beneficial is a weekly meeting of operating officials to plan the coming week's work. This group comprises the superintendent and his immediate staff—the mine foremen, master mechanic, outside foreman and chief clerk.

The Pittsburgh Coal Co. operating organization includes a production engineering department. To acquaint the face supervisor with time-study methods, modern production practices and the intricacies of cost determination, two supervisors are "going through" this department all the time. They receive their usual pay and spend six weeks in this training. While this is excellent experience, it is apparent that giving all the face supervisors this training under such a plan is a lengthy process.

Our company also gave all supervisors in the mines and shops, including top operating officials, three courses originated by the Training-Within-Industry Division of the War Manpower Commission—Job Instructor Training, Job Relations Training and Job Methods Training. Several employees were trained as instructors by T.W.I. and then conducted the classes. Each class met two hours each evening for five evenings spread over a three-week period.

Frankly, it was difficult to arouse enthusiasm over the Job Instructor Program. This was expected, due to the fact that supervisors in coal mines have not felt they were employed for job teaching. There is no doubt that a repetition of this course at a later date will be much more beneficial.

Because of the many difficulties involved in handling personnel the course in Job Relations Training was received with much interest and enthusiasm. The same procedure was followed as in J.I.T., as the procedure is standard in all Training-Within-Industry courses. The central theme in this course is "Get the facts" and this became a byword at the various mines. It has helped tremendously in obtaining the essential facts in the settlement of grievances and other dealings with personnel.

We are in the process of giving every supervisor Job Methods Training. The enthusiasm for this particular course is as great as it was during the time the J.R.T. courses were given. With a proper follow through on this program definite cost-reduction results should be secured.

The association of foremen in small groups where it is necessary for them to enter into the discussions helps them learn how to express their thoughts orally. Most of us do not appreciate that many persons find it difficult to talk before a group. It is important that this be kept in mind in formulating plans for any type of training for supervisors or others.

The result of all these attempts to give the foreman the training he needed was the realization that it was not enough. Two factors were against us. First, we were not taking enough time to do a thorough job. Second, we were asking the foreman to spend too much of his own time on matters of job interest. (The J.M.T. classes are being held on company time.)

Conference Plan Adopted

The following plan was suggested, developed and is now in effect. Foremen are released from the job for as many days as necessary to attend conferences at a central point in our geographical area. Eight or nine foremen from four to five mines spend from three to five days away from home at Library, Pa., where the production division offices are located. Comfortable living quarters are provided and meals are furnished at our store grill.

This plan was inaugurated in 1942. The first series of conferences required five days. In these sessions various members of the line and staff departments of the organization were the conference leaders. Before the program started, all those who were to participate as leaders took a four-hour course in how to conduct successful conferences. This may seem a rather short time for such an important subject but most of the men who were to lead the conferences had had previous experience and this was merely a refresher course.

A printed program was given each foreman on his arrival and the schedule was faithfully maintained. An alarm clock was kept in the conference room and was set to ring at the closing time for each session. One of the points to be impressed upon the conferees was that once a plan has been agreed upon it should be put into practice, as far as possible, without deviation. Most conference leaders had prepared booklets containing data on the particular

Supervisors participating in the conferences spend their allotted time at operating headquarters, where comfortable living quarters make pleasant the non-working hours. Association with fellow supervisors, as well as with company executives, promotes a friendlier, easier relationship between bosses themselves and between bosses and men "up the line."

subject being discussed. The production manager of the company explained the aims and objectives of the conferences.

Training for the supervisor was not the sole objective. Opportunity also provided for visits to the general office in Pittsburgh, the production-division office, the offices of the medical examiner and employment supervisor, the central repair shops and the central storehouse.

A typical program for a five-day conference is summarized elsewhere in this article. As can be seen, the aim is to familiarize the supervisors with company affairs and give them practical help in leadership, employee and community relations, efficient conduct of safety, maintenance and production work and product control. An opportunity is provided for meeting and getting acquainted with top officials, and relaxation and entertainment are not neglected.

During the panel discussion which was a high spot of the final session foremen were urged to ask the conference leaders any questions they wished on any phase of the company's activities, policies, procedure or operations. Answers often provoked discussions frequently resulting in changes in policies and procedures. Following the question period, the conferences closed with the production manager presenting each participant with a booklet entitled "Management Guide" outlining generally the operating policies of the company.

No attempt was made to hold conferences during 1943 because of unsettled conditions in the industy caused by the inability of operators, miners and government to come to an agreement on the wage question. They were resumed in 1944, but were shortened, however, from five to three days. More time was devoted to the actual problems faced by the supervisors and a definite effort is being made to give them help in solving some of their more difficult ones.

Practical Aid the Goal

The program includes discussions of current problems by the production manager; a review of the most pressing personnel problems with discussions of what to do about them; the financial picture for the previous year, presented by the assistant to the president; production, cost results and projections by the industrial engineer; mechanical methods by the mechanical engineer; mine ventilation by the safety director; market demands by the product-control manager; engineering guides to good mine operation by the mining engineer; maintenance organization for efficient production by the maintenance engineer; and a discussion of the prevailing agreement with the union led by the general superintendent. A conference on participation in community activities was led by one of the superintendents and a presentation of our policy and some of the problems to be solved in connection with the reemployment of veterans was made by the medical director. As in the previous conferences, all of the conference leaders met with the supervisors for a panel discussion on the afternoon of the third day.

Several distinct advantages come from conferences of this type in addition to the benefits of the discussion of mining and personnel problems. Many of the foremen have expressed their appreciation for the opportunity to meet and talk with various officials about whom they had frequently heard but had never seen face to face. The resultant "first-name" acquaintanceship has been distinctly helpful. Many of the foremen also declare that their conference experience has been helpful in overcoming difficulties involved in expressing themselves to and within groups.

The willingness of the conference leaders to discuss any subject which the foremen suggested was a very valuable proof of the sincerity of top management. In fact, this one thing probably is one of the best results of the program, since sincerity is not an article that can be bought and sold. It is a deep-rooted philosophy of life

and business that must be proved to gain real acceptance.

Through a statement made recently, at a meeting of the American Management Association, we were brought to realization of a very serious disadvantage in a strictly line and staff organization: i.e., the inability of line officials to find out what others in different levels of the organization are thinking and talking about, which if known would help the organization. When there are a large number of supervisors in the management level immediately in charge of the workers, displeasing policies and procedures can become serious. We have over 150 assistant mine foremen who, in most instances, report to the mine foremen. At some mines they report to a production foreman. Should one of the production foremen or a mine foreman be unsympathetic to the complaints of a large group of assistant foremen the organization could suffer considerably.

Organizing for Facts

Our mine foremen and superintendents felt very definitely that matters were being discussed by assistant foremen which were not coming up to them. To overcome this difficulty, which exists in many organizations, the assistant foremen at each mine were given an opportunity to select one of their number to meet with the industrial relations manager at dinner meetings where they could present any matters they desired. The purpose of the meetings was explained and the following specific promises were made:

1. Matters discussed would be kept in a written record made at the meeting.
2. No reference was to be made to the person or persons, mine or mines originating the subject of discussion either in the written record or after the meeting.
3. A copy of the written record of the meeting was to be presented to each superintendent with another copy to the assistant foreman from each group in attendance at the meeting.

The foremen cooperated in this endeavor to discover procedures not to their liking. The first meeting brought to light nine subjects on which they desired information. The results showed definitely that some means must be provided in any organization whereby a group of employees, whether workers or management, can transmit their points of view and ideas on up.

Top management many times takes too much for granted the ability of others to see eye to eye with them in matters pertaining to management functions. It is admitted that there may be some who do not want to look at management the same way as the "brass hats." However, there also are many who do just that but are not given sufficient information to understand fully what motivates the various orders and instructions.

It is extremely important, therefore, that the various levels of management meet frequently for free and open discussion of problems and policies. Opportunity also must be given for all employees to express themselves to some one in the organization who will keep sources of information confidential but, by cooperating with the proper officials, will be able to get matters adjusted when necessary.

The group of assistant foremen who meet once each month do not assemble solely for bringing to light their dissatisfactions. The meetings also were intended to provide a good opportunity for having proposed procedures prejudged by the foremen themselves, thus giving the company an opportunity to test possible reaction to proposed policies and permitting the foremen a chance to express their views on changes before they take effect. It is not always practical to discuss changes in advance because of the time element involved, but when it can be done advantage is taken of the opportunity to do so.

In addition to making supervisors a more integral part of management through meetings and personal contacts, our company furnishes each supervisor with a set of standard-practice instructions which embody all the written policies of the company pertaining to mine personnel and operation. The following paragraph appears in the introductory letter:

"Policy cannot be unchangeable. Circumstances arise when it is necessary to amend, completely change or nullify certain policies. New conditions may call for new policy. Every member of the management group who has a copy of these instructions may express his disapproval of any policy or suggest changes. This should be done by letter to the industrial relations manager. Such comments or suggestions will receive the thoughtful consideration of a policy committee and in all instances a reply will be made."

These sincere attempts to make the supervisor more willing and able to accept his responsibility as an important part of the management group must emanate from top management. No top management officials should be so naïve as to believe these efforts completely accomplish the purpose in view. Management must prove that the attempt to give the foreman his rightful place in the management group is not an expedient due to the present high production levels demanded by the war. Neither is it a policy founded on purely altruistic motives. It is just good business sense. Management consists of the ability to put ideas to work through someone's hands. To get production someone must get the idea over to the workers and that someone is the foreman. On top mangement falls the responsibility of giving the foreman all the tools of knowledge he must have for converting ideas into production.

Making Collective Bargaining Work

Let us look for a little while at our third problem—our dealings with the union. Most unions were born of strife. Very seldom have they come into being without gaining distinct advantages for their members. Much of the time management has opposed granting the demands of the union and individual members have believed for years that the collective bargaining process is some sort of battle. All the means of warfare have been employed, including deception. This, of course, is not the real goal. Rather, it is stimulating both union and management leadership to a realization of the real opportunities for both in establishing mutual trust and confidence in collective bargaining procedures.

Let us face one important fact: both labor and management need each other. The goal of industry is to produce at a profit. Wages are related to profits. This means that both the union and management must be concerned about the profits in industry.

Given this common goal, what is the first step toward its realization? First there must be honesty of purpose and sincerity in performance. There is always the fear that to be honest opens the door for others to gain an advantage through dishonest or "smart" methods. But honesty does not imply that we lose our ability to foresee, plan or reason. Intelligent planning and execution of plans can take the place of cleverness. Top management and national leaders in the labor movement must lead the way.

Sincerity in practice requires a management force composed of persons

with the required qualities of leadership, including ability to recognize the fundamental needs and desires of workers. The ability to prevent and settle grievances is one of the most important qualifications of the modern supervisor.

Management must recognize that when the union presents a grievance on behalf of one or more of its members something must be done about it. The sincere approach, on the part of management, is to accept the complaint as sincere unless and until it is proved different. Knowing that production suffers when a grievance exists, management's aim must be to arrive at a satisfactory settlement.

Over the years we have discovered several basic faults in the manner in which supervisors have dealt with individual union members or with union officials. Outstanding among these faults has been the attitude of the supervisor. This has been, in many instances, one of suspicion and conflict. What these supervisors need most is to develop a feeling of self-confidence in their dealings with the union. Lacking it they often adopt an authoritative and overbearing attitude which is resented by the union members.

Acquiring self-confidence in management-union dealings is not easy. It must be expected that supervisors may err in judgment and actions. Unless a helpful, sympathetic attitude is maintained by top management, operating supervisors will be hesitant in dealing with the union officials as equals. They know the union is giving its support to its leaders but do they know that the company is backing them up? When supervisors develop confidence in their ability to meet individual union members or representatives of the union, they will not fear the possibility that the union will "slip over a fast one."

Another very apparent fault in union-management dealings was the firmly established opinion that since grievance machinery is provided in the contract, all grievances must be fed to the machine. Opinions of this kind are prevalent in all industry and great harm is done because they tend to eliminate all "humanness."

If the foreman will really take a personal interest in the worker with a grievance, he will find many ways to take action before it becomes necessary for the worker to go to his committee or steward to establish a "case." It then becomes a technical question and justice may be drowned in the sea of procedures.

If the foreman realizes that the important thing is to come to a satisfactory settlement he will listen carefully, get all the facts available, and then take the time to consult top operating management to see what settlement can be made *before* the worker finds it necessary to have the union representatives "fight his case." It is regretable that this expression ever came into being but it is the most commonly used. As long as both sides feel they are fighting for their respective wants and desires it will be difficult to get cooperation. Recognition of human urges and conflicts with a sincere desire to reach a common understanding is the main job of everyone in the management group.

Another of management's shortcomings in its dealings with the union comes from the fact that we forget that authority in a union usually comes up the line (from the rank and file) while authority in management comes down from the top. Union representatives always are answerable to the whole group and we forget that our actions must, as far as possible, make it easier for the union representatives to report back to the workers. This does not mean that all demands must be met. Very often the time when and manner in which a decision is given will save "face" for the union representatives. It is never good practice to "show up" a leader when some of his fellow union members are present. The little self-satisfaction we feel at the time is not enough compensation for the fact that we have tried to cheapen him in the eyes of those who look to him for leadership.

Time the Essence

Let us look at one more thing hindering our reaching a cooperative attitude in our dealings with the union. We do not take enough time to do a good job. Between-the-shift meetings with a committee can never be satisfactory. Time is a great healer and it can be used to great advantage. We should not make the very serious mistake, however, of using time just to delay decisions. Giving the worker the "brush off" can be done just as effectively by using time in the wrong manner as it can be done by refusing to listen to him—and the results are just as bad. Time, properly used, will do away with much of the heat in a grievance and usually will be productive of more light. Time must be taken to handle grievances with sincere personal interest.

Both the management and the union must be willing to understand each other's problems. Each meeting can be used for an informal discussion of the current questions affecting relationships. Management has done very little in the past to acquaint employees with the difficulties in the many phases of its activities. On the other hand, we have been delinquent in our desire to learn the problems confronting union officials. There can be no understanding without knowledge.

It is evident that what has been said is more critical of management than of unions. It may even appear that we have been tolerant of the union's weaknesses. This has been intended. Criticism of unions has been amply aired in the public press. Their leaders recognize some of these weaknesses and some of them are trying to overcome them. That is their job.

Our job is to find and weed out the weaknesses existing in management. There has developed in recent years a wholesome desire for constructive criticism. There are still some industrialists who feel that talk of a new day in labor-management cooperation is a transient thing that will be forgotten when the war is over and labor is once more looking for jobs instead of the jobs looking for labor.

Such management is shortsighted. In effect it is saying "we want a certain portion of American labor looking for jobs so our job will be easier." That is not the kind of an economy our boys are fighting for. Whether or not what we have chosen to call our American way of life continues to exist will depend on our ability to furnish jobs. The management that desires a certain amount of unemployment to make other workmen feel insecure does not deserve a place in the kind of a country we want.

Management must recognize that "labor" is not a generic mass but is composed of many individuals each of whom is entitled to his dignity as a man and to an intelligent, well-trained, honest and sincere supervisor who gives him the recognition and treatment he deserves.

If the worker chooses to exercise group control over his rights or desires by union affiliation he is justified in his expectation that management ought to play fair.

This is not an easy road for management to follow. Many times we will find ourselves on a detour of industrial conflict. If we use the guide posts of honesty of purpose and sincerity of practice we may find in the years to come the broad highway of mutual understanding which will lead both labor and management to the returns they have a right to expect. Not the least of these returns will be the satisfaction derived from a truly cooperative endeavor.

STRIPPING EMPLOYED

To Start Recovery of 20,000 Tons per Acre

Railroad, Tipple and Truck Road Completed and Strip Coal Shipped in Five Months—Crop Stripping of Area to Be Followed by Underground Mining in Seam 17 Ft. Thick With Under 16 In. of Partings

By J. H. EDWARDS
Associate Editor, *Coal Age*

TWELVE FEET of available 15-ft. seam of Cedar Grove coal is being mined by stripping at a new operation, Hamill No. 1 mine of the Hamill Coal Corp., in a tract straddling the boundary line between Buchanan County, Virginia, and McDowell County, West Virginia. Although the tract contains only 150 acres of this seam, the potential yield at 75 percent recovery is 3,000,000 tons. Development required building 2.1 miles of standard-gage railroad to the tipple site and 2 miles of mountain highway for motor-truck haulage. After the crop stripping has been completed the heavy-cover portion of the tract will be mined underground. The property also contains the Eagle seam of high-grade high-volatile coal. This will be mined by underground methods some time later, and the potential yield is 15,000,000 tons.

Noteworthy speed, considering existing shortage in materials and labor, was shown in opening the mine. Surveying for the truck road was started Feb. 1, 1944; construction of the railroad got under way April 1 and the first coal was shipped from the completed tipple July 10. Within two months production had been raised to the projected 28,000 tons per month. The highest loaded in one day was 1,552.

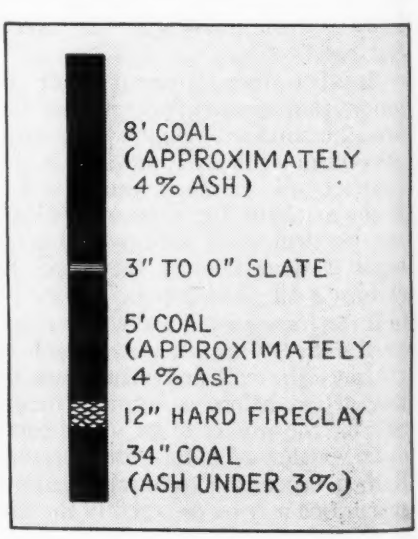
The tipple is on Upper Elk Creek off Knox Creek. Along the latter runs the N. & W. branch line to Grundy, Va. Coal shipments from the new mine move down Knox Creek and arrive on the main line of the N. & W. at Devon, W. Va., which is 18 miles from Williamson in the direction of Welch. The shipping point of the mine is Ward, Va.

A merging of the two seams, the Cedar Grove (locally the Upper Thacker) and the Lower Cedar Grove (Lower Thacker) is responsible for the great thickness of coal. A top bench averages 8 ft. (its range is 7 to 9 ft.). Below it and separated from it by a 3-in. slate parting (which disappears in places) is a 5-ft. bench (range, 3½ to 5 ft.). Inherent ash of the coals in these two benches is around 4 percent. Below them is a 12-in. stratum of hard fireclay which tops a 34-in. bench (range, 32 to 36 in.) of coal of inherent ash less than 3 percent. In the present stripping operations the lowest bench is being left but is kept free of dirt castings so it can be taken later.

The seam lies practically level at 2,000 ft. elevation. Except for a mountain-top gap which cuts out part of the coal thickness and has caused some of the deposit to become weathered beyond use, the acreage is in one tract. About 140 acres are in Virginia and 10 acres in West Virginia. Cover ranges from nothing to 250 ft.

Elevation of the railroad track at the tipple is 1,070 ft. Thus, in the two-mile haul to the dump at the tipple, the coal is lowered approximately 950 ft. Except for 400 ft. of 10-percent grade, the maximum grade of the highway is 9 percent. The ordinary range is 5 to 9 percent with an average of 7.2 percent. Road width is 16 ft., af-

Loading the upper 12 ft. of coal without shooting into a 5-ton truck, using a 1½-cu.yd. shovel. In the background, a 1¾-cu.yd. shovel is digging the second cut and a bulldozer is rehandling the material by pushing it down the bank.



Section of the seam now being recovered at Hamill No. 1 mine.

fording ample space for trucks to pass at any point. Ditches and culverts are provided for drainage and the roadway is surfaced with 10 in. of 2x0-in. crusher-run limestone.

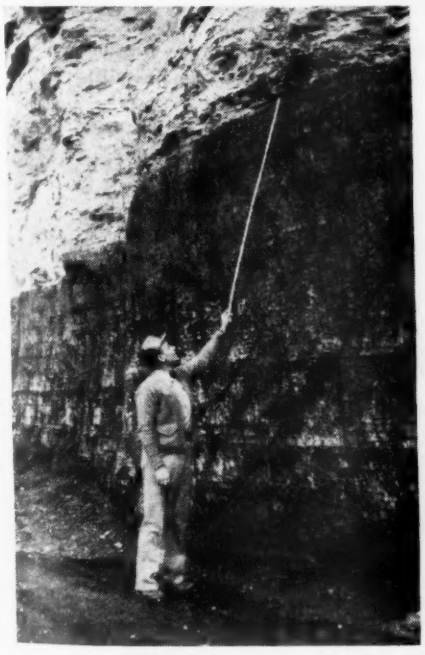
The tipple is equipped with an apron feeder, apron-type picking table and single-roll crusher. All of the coal goes through this crusher, which is positioned above the center of the single track. For some of the loading, the crusher is operated wide open, making a 5-in. resultant. For the remainder it is closed to make a 2-in. resultant. The hillside hopper into which the trucks are dumped holds 90 tons. A grizzly at the end of the feeder serves to bed the fines onto the apron conveyor and deposit the coarser material on top so it can be picked. Five men are employed on the picking table.

Mechanical power to drive the tipple machinery consists of two four-cylinder 60-hp. gasoline engines with clutches. One drives the feeder and picking table and the other the crusher. To insure against a prolonged shutdown in case of an engine difficulty a third unit of the same type, but without clutch, is stored beside the tipple. These engines, made by J. I. Case Co., Racine, Wis., were purchased new for the job. They are equipped with magnetos and are without generators, starting motors and batteries. Starting is by hand cranking.

At present most of the coal goes to industrial markets. Space has been

In this low gap, the coal was partly cut out and weathered beyond use.

A 5-ton truck dumping into the 90-ton hillside hopper feeding the tipple.



D. V. Ward, chief engineer, holds the end of a 6-ft. rule at the top of the coal—total height 12½ ft. He stands on the 12-in. fireclay parting, under which is 34 in. of lower-ash coal.

After a 1¾-cu.yd. shovel (right rear) opens the pit by digging to the hard rock, the wall is drilled with a horizontal gasoline-powered drill. The 42-ft.-long holes on 12-ft. centers are loaded with 4½-in. sticks of dynamite. Visitors are (left to right): F. B. Daniel, contractor; W. T. Smith, foreman for the contractor; D. V. Ward, chief engineer for the coal company; and Clifton P. Huff, Virginia gasoline tax department.

prepared for a three-track tipple to be erected prior to underground mining.

The trucking of the coal from the strip pit to the tipple is contracted to Clayton Winders & Sons and for the job they use twelve 5-ton International trucks and one 10-ton Ford truck. All are gasoline-driven and have end-dumping power-hoist bodies.

Work Done by Contract

Stripping and coal loading are done on contract on a per-ton-of-coal basis by the F. B. Daniel Co., Huntington, W. Va., and Orange, Va. The contractor uses the following equipment on this job: One Lorain 1¾-yd. 80D diesel shovel; one Bucyrus-Erie No. 43B gasoline shovel with bucket of the same capacity; one Bucyrus-Erie 1½-yd. loading shovel, gasoline-driven; two Caterpillar D8 tractors with LeTourneau bulldozers; one Caterpillar D7 tractor with LeTourneau bulldozer; one Caterpillar Auto-Patrol No. 112 grader; one Ingersoll-Rand 315-c.f.m. gasoline-driven air compressor; and two Hardsocg horizontal drills.

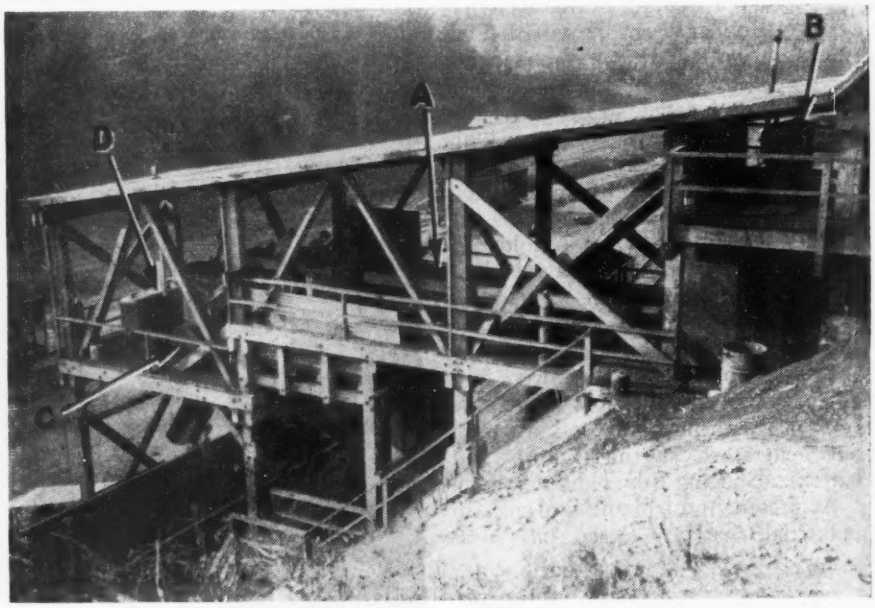
One strip shovel opens the first cut without shooting and works back to the hard rock. Horizontal holes 42-ft. deep are then drilled on 12-ft. centers for the shooting, which is done with 4½-in. duPont dynamite.

The other strip shovel digs the broken rock and the bulldozers rehandle more than 50 percent of this material by pushing it down over the mountainside. With the present equipment the stripping is carried back to a cover depth of 40 to 60 ft. and in that work the average width of marketable coal uncovered is 50 ft. The coal is dug without shooting. Both stripping and loading are on a two-shift basis.

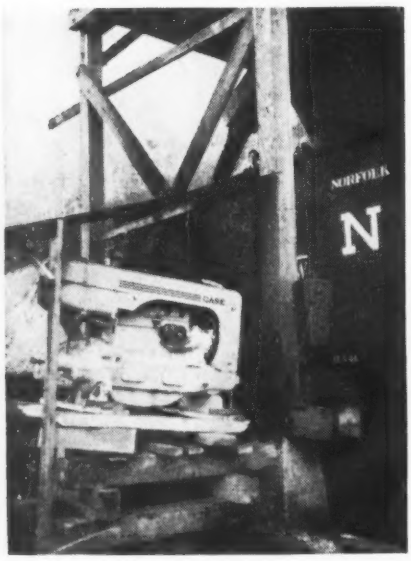
Haulage in the pit is on top of the 12-in. stratum of hard fireclay which covers the 34-in. bottom bench of higher grade coal. That coal will be loaded after the stripping and loading of the 12-ft. bench has been completed for the whole perimeter of the 150-acre tract.

It is possible that later a larger shovel will be secured to strip another cut around the tract. In any event, plans are under way to deep-mine the remainder by a mobile loading machine and rubber-tired shuttle cars.

A. L. Rowe is superintendent and tipple boss. The company is headed by C. A. Hamill, of Huntington, W. Va., who also heads the Greenbrier Smokeless Coal Co., operating a mobile loading truck mine near Charmco, W. Va. (*Coal Age*, December, 1942, p. 60). His offices are at Cinderella, W. Va., where for some years he has been president of the Sycamore Coal Co., Sycamore Coal Corp. and the Cinderella Coal Corp. F. A. Heitzman, of Cincinnati, is vice president; T. C. Hamill, Huntington, is secretary; J. C. Cassells, Cinderella, is assistant secretary; and D. V. Ward is chief engineer.



Apron-type picking table (A) and apron feeder are driven by gasoline engine (B). The crusher (C) is driven by a similar engine (D).



This spare gasoline engine is ready in case of failure of the two similar units driving the tipple machinery.

The single-track tipple serving Hamill No. 1 is operated two shifts and loads 30,000 tons per month.

TODAY'S SCHOOL

Helps Turn Out the Miners of Tomorrow

Logan County, W. Va., Vocational Training Plan, Set Up With Help of Operators, Union and School Board, Not Only Equips Young Men For Mine Work But Shows Opportunities For Careers

By S. T. DeJOURNETT
Superintendent, Logan County Schools
Logan, W. Va.

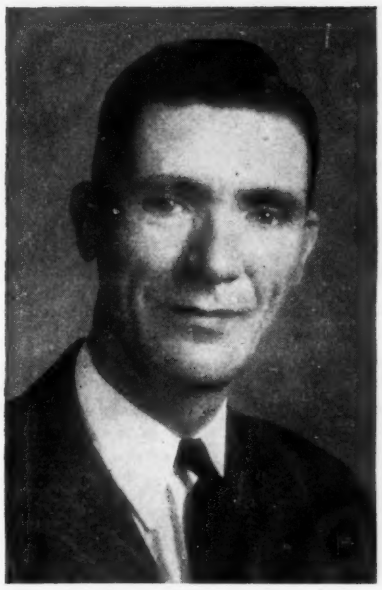
MANPOWER for coal mining, both for present and future needs, is without any question one of the outstanding problems which the industry faces. Two factors have combined to place obstacles in the coal industry's path in hurdling this problem. The first has been a growing reluctance, often encouraged by the parents, on the part of young men in mining areas to enter coal mining as a life occupation. The second has been the rapid mechanization of the mines.

The first obstacle has resulted in a serious lack of young men entering the occupation to replace those who are ready to retire. The second factor has created a need not only for skilled new men but for upgrading present employees so that they would be more efficient workmen.

Progressive coal men long have recognized that there were two means of overcoming these difficulties: education and information; education both for present employees and for future employees; information for prospective employees on the advantages of coal mining as a career.

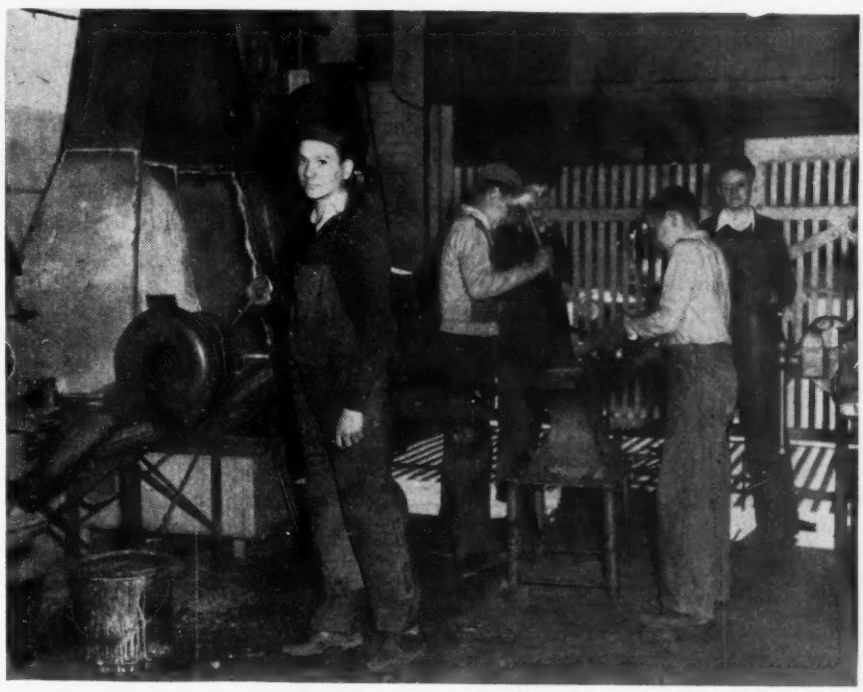
It was with some of these reasons in mind that the Board of Education of Logan County, West Virginia, in cooperation with coal operators, officials of the United Mine Workers of America, and other industrial leaders sought out a plan to try to supply "Tomorrow's Miners," as Coal Age calls them in its July, 1944, issue.

To understand the background of this plan we must go back to the end of 1941 when our nation found itself engulfed in world conflict. Realizing that we were not prepared for this struggle, the Federal Government offered to help any county that would sponsor a national defense school to train workers for shipyards, aircraft plants and other war essential industries. Feeling that there was a surplus of labor in Logan County, the Board of Education offered to sponsor such a school. The school was a great success and thousands of workers were trained and sent to vital war industries. But, as the supply of excess labor was shipped out of this county, the drain on mine labor became greater and greater.



S. T. DeJournett

Realizing that coal was essential and that the mines must operate at peak to power war industry, operators, union representatives and school officials called a meeting to decide future policy. Two choices were evident: either close the school or reorganize the program to furnish more and better trained workers for the mines. The latter plan finally was chosen. A new executive committee and advisory board composed of representatives of the coal operators, union officials and the Board of Education was appointed.



Machine-shop practice is stressed as part of the training at the Logan County school. Here is a group of students at work on welding and blacksmithing.

This group chose a committee to study the needs of the mines and make recommendations on the type of program to serve the mining industry best. Little did the committee realize that its recommendations would be so significant that the plan would spread throughout the mining counties of the State and possibly to other states.

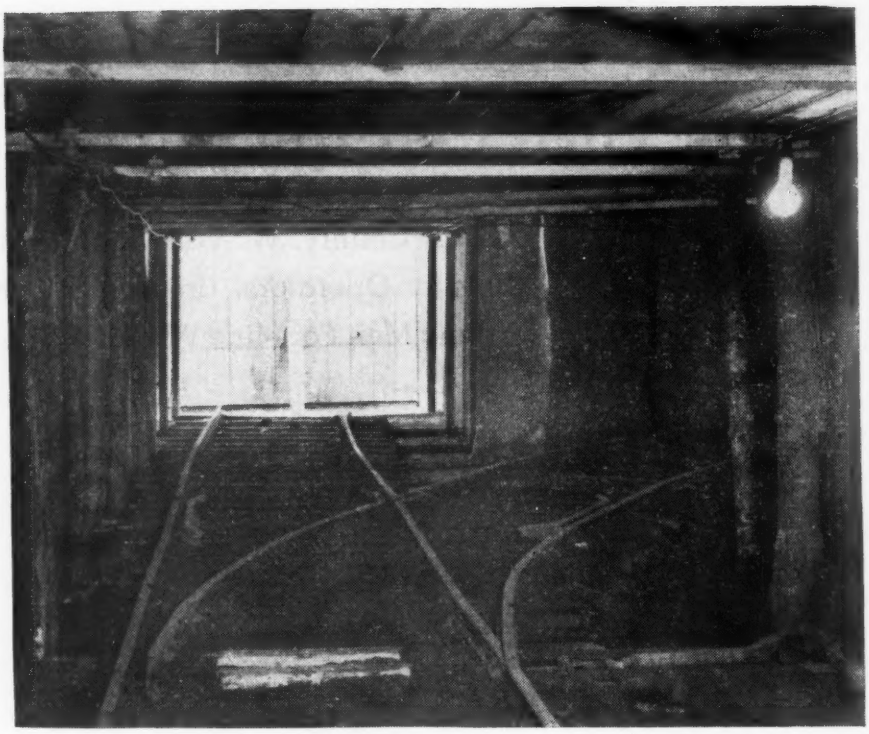
The problem divided itself into two parts: first, a plan of attack; and, second, a method of carrying it out. In the development of the plan of attack the first decision to be made was the ultimate objective of the school. Would it be immediate, serving the mining industry just during this emergency, or was there a possibility of a far-reaching, long-term plan to serve Logan County and the coal industry? If the latter were possible, then certainly such a program should be correlated with the academic public schools.

New Factors Encountered

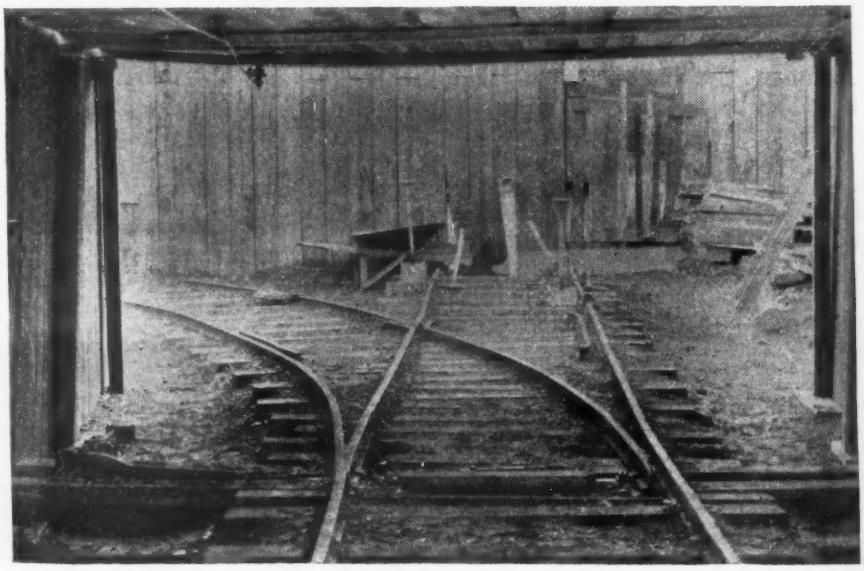
A careful survey revealed that most of the boys and girls being graduated from our high schools returned to their respective communities to seek employment either directly or indirectly connected with the mining industry. This survey also showed that most graduates of our high schools did not seek further education. At the same time the armed forces were pointing out vividly our lack of vocational training. These three factors formed a sound argument for endeavoring to do something in the way of vocational preparation. It was not a question of too much emphasis on preparation for higher education in our high school training courses but rather one of too little on vocational training for the majority of pupils who would not have the opportunity of a college education.

The next step was to obtain the sanction of representatives of the vocational department of the State Department of Education. There were two reasons for this. First, the program was to work in conjunction with and be a part of our regular school program. Second, no such venture had been tried before and we realized the need for all possible assistance. Approval was granted immediately. Without this assistance and the wholehearted support that was to come from this branch of the State Department of Education the journey of this school would have been both longer and harder.

The plan submitted proved to be beyond the State's power and federal approval had to be sought, since the various State vocational departments were allowed to expend funds only for institutions known as defense schools.



Underground experience is duplicated at the school by work in rooms off this entry.



Another view of the entry where pupils become familiar with modern mining methods.

The proposal was submitted to the War Manpower Commission to obtain its sanction for federal funds under the George-Dean and Smith-Hughes acts. Jack Hardy, of the vocational department of the U. S. Office of Education, was sent to Logan County to investigate the project and make recommendations. He approved it and it appeared that the last obstacle had been overcome.

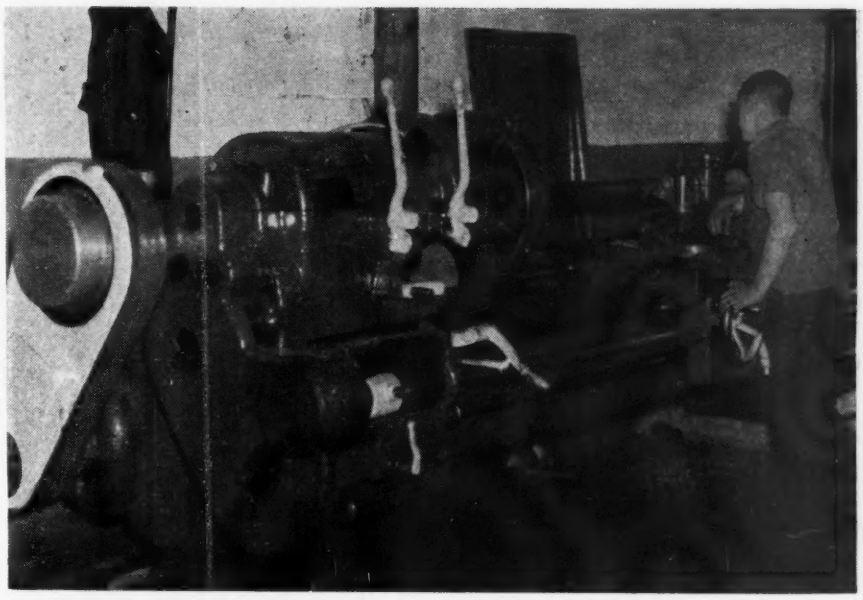
As the school began to take shape it quickly was recognized that its potential possibilities had been greatly underestimated and that much more equipment would be necessary if the objectives were to be achieved. Application for equipment was made through the State vocational department to the Federal Government. L. S. Hawkins, national director of vocational education, and Mr. Hardy again came to Logan and, after a thorough investigation, approval was granted. It was predicted then that this type of school would spread throughout the mining industry. To date there are eight other such programs in West Virginia alone.

Since this was the first time within our knowledge that such a plan of vocational training had been at-

tempted, the trial and error method had to be used, and it proved long and costly. The search for better methods, obtaining machinery and tools, setting up an administration, getting various approvals from both State and Federal governments took the greater part of a year. Special precaution was used in the purchase of each piece of equipment to insure its being the most modern and having a practical application to the mining industry. All this combined to keep the program from really coming into its own until last fall.

To date our school includes six well-equipped departments. The first is a machine shop equipped with all modern machines generally found in mine shops, such as lathes, motors, milling machines, grinders, shapers, mining equipment, routers, etc. The student practices on each piece of equipment until he or she is thoroughly familiar with its use.

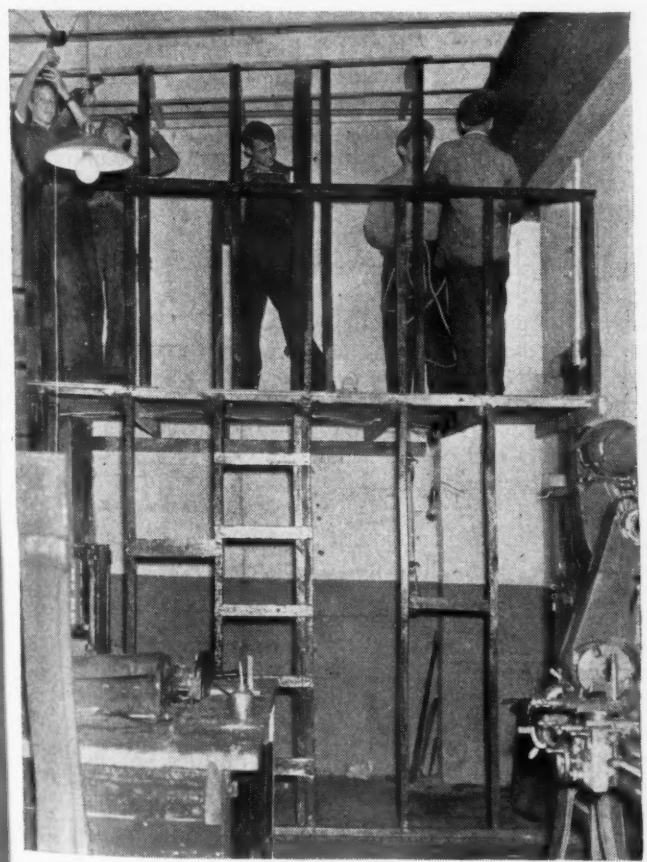
The drafting and blueprinting department is another. Here the student is taught to read mine maps, to trace and sketch, and to draw and blueprint parts of equipment to be repaired. Third is the welding shop. The student is taught all kinds of welding at all angles. Different materials are used and actual machinery is repaired.



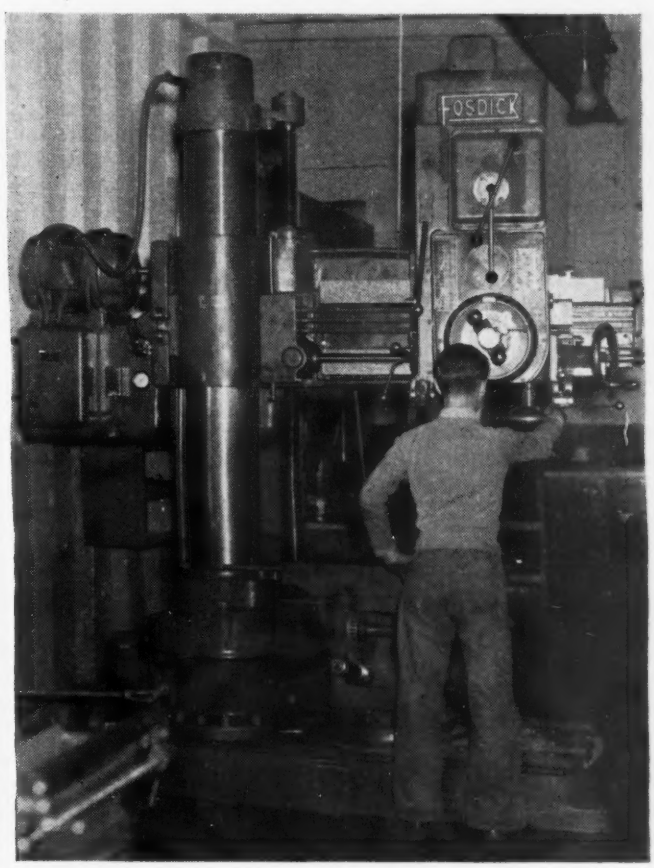
All equipment at the school is up to date and practical. A pupil is shown here operating a lathe in the machine shop.

The fourth is a forging department. The student is taught the use of these tools so that he will be familiar with them if the need should arise for him to use them. The electrical department (fifth) gives trainees instruction in almost any type of electrical work to be found about the mines. The framework of a house is set up so that the students will have a fundamental knowledge of standard wiring. Besides this there are armature winding, motor repairing, control wiring, and other electrical work.

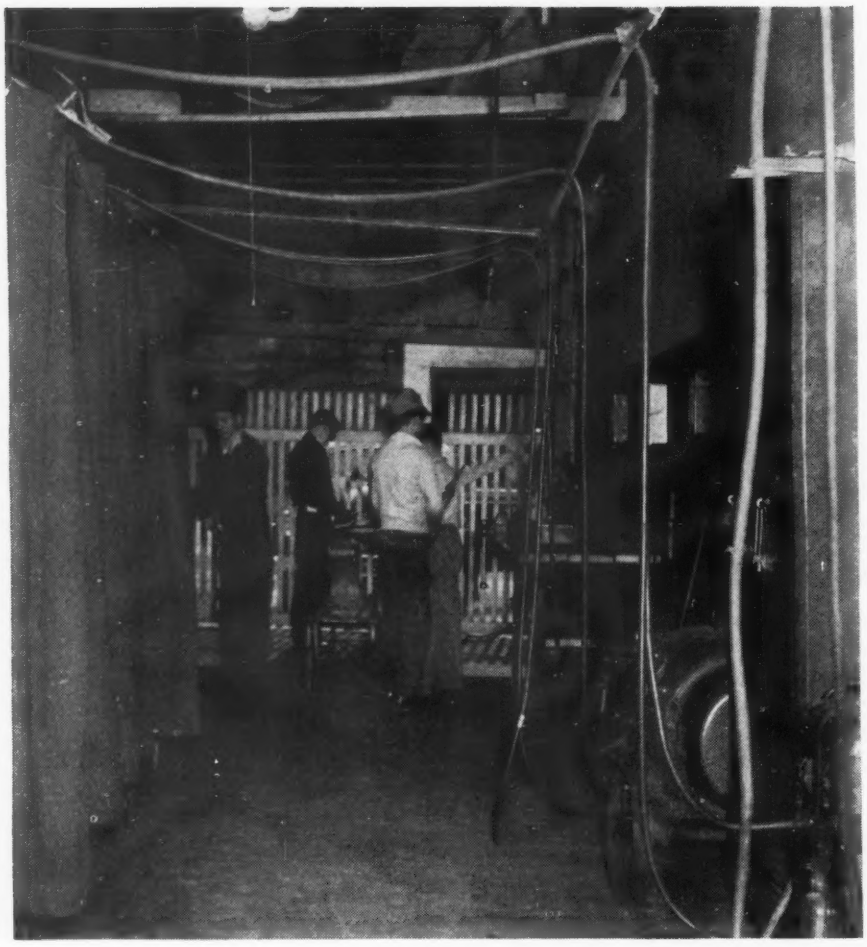
Sixth is the mine entry constructed of wood with several side rooms and



Electrical work occupies part of the curriculum and this house framework teaches the pupils the fundamentals of wiring.



Each pupil is taught the use of machine tools, illustrated here by one of the boys operating a drill press.



A section of the machine shop showing some of the electrical equipment and, in the background, a group at work at the forge.

sufficiently flexible to allow the tunnel to be varied according to different mine conditions. Here are taught tracklaying, ventilation, timbering, cutting, drilling, shooting, conveying, wiring and all other underground operations. Actual equipment such as is being used in the mines is installed so the training will be as practical as possible.

Each student is required to spend a definite amount of time in each department. The entire program is a three-year course taken in conjunction with the regular high school program.

It must be clearly understood that it is not the intention of the school to produce experienced miners. There is no claim to any replacement of practical experience. However, experience shows that this type of program can and does acquaint the trainee with modern mining methods and by practical demonstration refutes the false idea of back-breaking toil.

The advantage to the coal operator is evident, for when he gets a student from this school he knows that such an employee already has been broken in. There is an actual money saving in an immediate increase in employee efficiency instead of having to hire "green" workers who are being paid while they get their training down in the pit.

The school also offers training courses to the miner who wishes to be upgraded or is sent by his employer. Most of these men, however, come of their own accord. The plans also call for rendering assistance in the rehabilitation of returning soldiers.

Related work is offered with each class to give the student a conception of the field of work beyond the machine he operates or the motor he repairs.

So that the teachers may keep abreast of the times, a teacher-training program of four hours weekly also is offered. Specialists representing all fields of work connected with coal mining are brought in as instructors. So far, teacher-trainers have been furnished by Island Creek Coal Co., Holden, W. Va., and the West Virginia Coal & Coke Corp., Omar, W. Va. As the need arises others will be obtained from sources such as the State Department of Mines, West Virginia University School of Mines, United Mine Workers, manufacturers of mine machinery and others.

Too much credit cannot be given to the two local coal companies mentioned for their able assistance in the inauguration of the school. Had it not been for their unselfish and untiring efforts and wholehearted assistance the school might yet be groping in the dark. Quick to realize the value of education, these two companies offer employment to all graduates of the school. In addition, students coming from the school are entered immediately in a job-relations training program which hitherto has been offered only to employees who have been with the companies a long time and have proved their ability to advance. The job-relations training is conducted by the companies.

Trend to the Farm?

Of the 172 students enrolled at the school, 15.1 percent are not sons of miners but come from an agricultural area. This fact is significant in that it indicates a trend toward an economic transition that has been in progress in this locality for some time. Mine employees have been moving to small farms or places where they could have at least a garden and raise some livestock. Many miners feel this plan is a sort of insurance against the time when the mines again may return to short days and weeks.

Another important fact is that 17.4 percent of the students are employees using the school as an opportunity for upgrading. This procedure is encouraged by the operators and more rapid advancement is the prize ahead.

Where will tomorrow's miners come from? The answer seems evident. The day has passed when sufficient education could be obtained from the books of the little red schoolhouse. Likewise the day has passed when the employees without technical and practical knowledge can expect to keep pace with an electrical and mechanical age.

Education and industry alike are becoming increasingly aware of those facts. They are realizing, too, that neither can progress far without the other. Coal mining is no exception. More and more its efforts are being directed not only toward improving the knowledge of its present employees but toward the training and education of prospective employees. More widespread and persistent work in pointing out—and creating—the opportunities for successful careers in coal mining will help tap new sources of better manpower for the years to come.

SHAKERS AND SCRAPERS
Meet Loree Mining, Manpower Problems

Shaker Conveyors and Scrapers Used at Loree No. 4 in Both Solid Blocks and Second Mining—Shaker Operation Improved by Several Special Operating Ideas—Booster Shots in Undercut Ease Loading

By **RALPH R. RICHART**
Assistant Editor, Coal Age

MECHANICAL MINING is boosting production and making better utilization of manpower at The Hudson Coal Co.'s Loree Colliery No. 4 shaft, Plymouth, Luzerene County, Pa. Shaking conveyors are used in the second mining operations in several veins and scrapers recover the solid blocks left in others. Because of the war's demand for coal this property was reopened in 1941 after having been idle for approximately ten years.

At present, mechanized mining is carried on in the Top Ross vein, in the Twin vein, 20 ft. above it, and in other veins as well. The Top Ross has a sandstone bottom and black slate roof. Usually 6 in. of drawslate comes with the coal. Considerable attention is paid to timbering in the area where shakers are being used in second mining. Here, 6x8-in. collar bars 10 ft. long are placed on two legs every 5 ft., the minimum timbering requirement.

Among other applications, a Goodman E 11-63 10-hp. shaker is used by a three-man crew to drive a 24-ft. chamber, splitting a 125-ft. plane pillar. The crew, consisting of a miner and two laborers, completes the cycle of cutting, drilling, shooting and loading one fall of coal per shift. A fall makes from 16 to 18 2-ton cars. While the coal is being run over the pan line, two members of the crew remain at the face and the third tends to the discharge end. Men at the face keep in touch with the loading man, who runs the shaker, by means of a bell signal system which operates from a 6-volt dry-cell battery.

A number of operating ideas, common to all the pan-line installations in

Left, air drill inclined at 20 deg. and ready for use by the miner and his two laborers. Right, shaking conveyor begins loading of a fresh fall of coal.

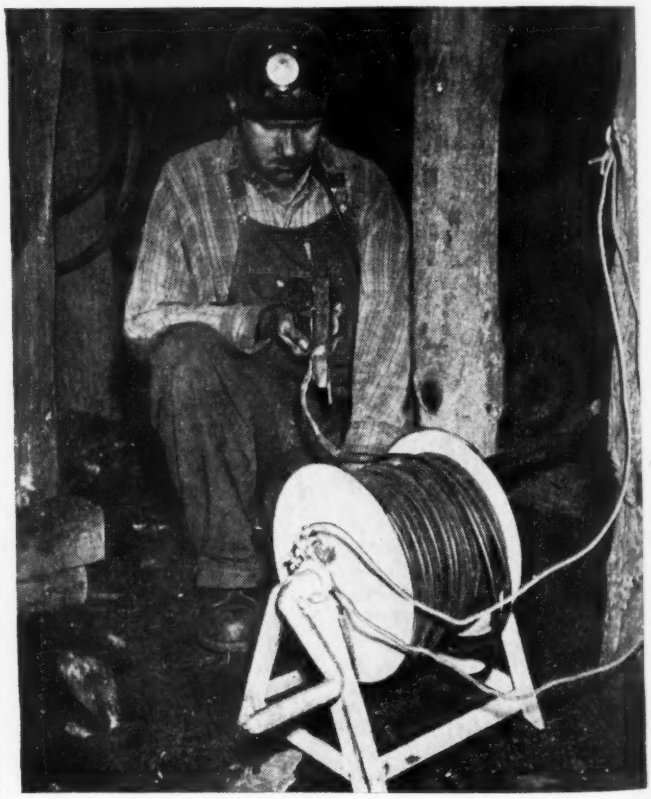
this colliery, deserve special mention. At the swivel trough section of the pan line, where the shovel and feeder troughs pivot about the end of the last section of standard trough, a steel pin is anchored in the floor of the chamber. This pin takes the place of the pendulum jack usually employed and answers the same purpose: i.e., holding the face end of the pan line in place without interfering with the customary motion. The air hammer, which is available at the face of each chamber for drilling the coal, is used to drill a 2-in. hole into the floor to a depth of 18 in. A $1\frac{7}{8}$-in. mild steel pin is dropped through the hole in the radius rod and into the hole drilled in the floor. This operating idea works only where the floor is made up of hard material. In this instance the floor is hard sandstone.

At the swivel trough, a pin driven into a hole drilled in the floor takes the place of the usual pendulum jack.

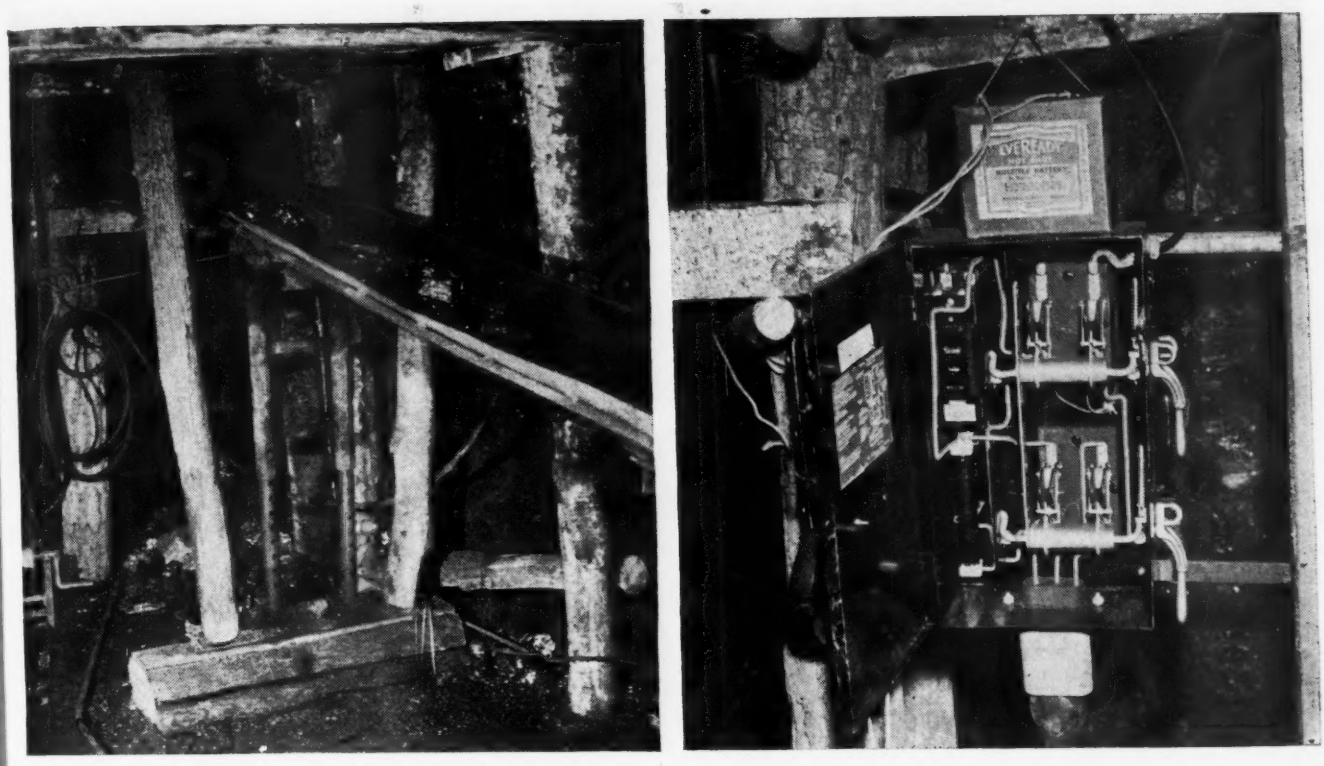
All pans are designated as Type K-275 (which corresponds to the Goodman Size 0) and are fabricated by spot welding at the Providence Shop (November, 1944, *Coal Age*, p. 80).

Another important part of the pan line equipment is the adjustable rocker supports installed between the drive and the discharge end of the line. The credit for this idea, according to J. M. Reid, general superintendent of mines, belongs to the Union Pacific Coal Co., Rock Springs, Wyo. While visiting the Union Pacific's properties in 1938, Mr. Reid noticed this operating idea and was given permission to copy and use it. Upon his return, the idea, with some slight modifications, was incorporated in many of the pan-line installations of The Hudson Coal Co.

For starting the 10-hp. compound-wound motor powering the shaker chute drive, a Type T-8112 Trumbull



Left, pan line slopes up evenly to discharge point. Right, Sheldon Decker, face boss, inspects signal switch and line before it is pulled to the face.



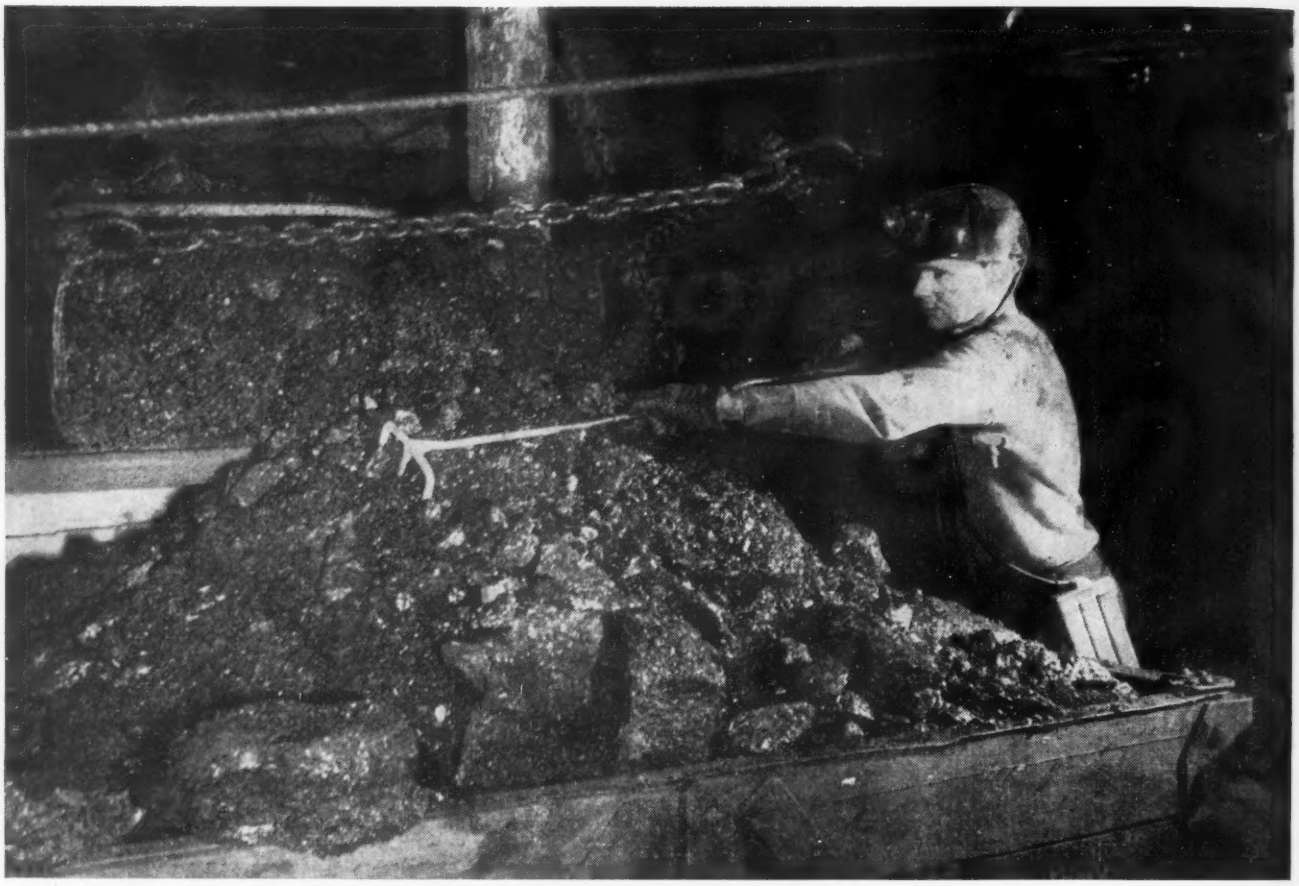
Left, adjustable rocker support in use showing method of securing it in place. Right, manually operated switch for shaker drive, with signal bell mounted on cover, is located near the car-loading station.

275-volt d.c. starter with a 50-amp. I-T-E circuit breaker and two double-pole single-throw mechanically interlocked knife switches mounted in the same cabinet, is used. The upper switch is closed first, energizing the shunt field to approximately 80 percent of its full strength and is kept closed even when the drive is not running. The lower switch is used to stop and start the shaker drive motor by energizing the armature and also putting a full shunt field on the motor. This starting arrangement is a modification of the conventional across-the-line type of starter, because with the shunt field already energized to 80 percent of its full strength, the starting armature current is reduced, with less flashing at the commutator. This type of starter also permits keeping the motor dry during idle periods, since the shunt field is energized at all times. Miller molded rubber cable connectors are used on the circuit between the starter and the motor.

Shaker drive is mounted on timbers to provide cushion for bedplate Ratchet jacks are inclined at an angle of 15 deg.

Getting back to face preparation in the chamber previously alluded to, the crew uses a Jeffrey 24B longwall cutter equipped with a 6½-ft. cutter bar. After the coal has been undercut, a JA-35 Ingersoll-Rand "Jackhamer" with 1⅞-in. detachable bit is used to drill six holes in line across the 24-ft. face, 4 ft. above the floor. All the holes are pointed up an angle of 20 deg. and are loaded with 1¼x8-in. du Pont "Monobel D" permissible explosive. Each rib hole is loaded with five sticks and all others with four. DuPont No. 6 electric blasting caps are used and all six holes are tamped solid.

In addition to the explosives used in the six holes, five sets of boosters, consisting of four sticks each, are placed in the undercut. These boosters are shoved to the back of the cut with each one placed midway between adjacent drillholes. These booster charges are exploded in sequence by duPont D-56 delay electric blasting caps. In firing the shots, the six holes are fired first and go off instantaneously. The boosters then are fired and the delay after each allows each charge to strike a separate blow to break up the coal. These booster shots prepare the fall of coal for easy and efficient duckbill operation. A duPont No. 10 electric



Scraper discharges its load from a wet place into the mine car.

Scraper hoist located 18 ft. back of "bridge-tree" for necessary fleet angle.

blasting machine is used for firing the explosive charges.

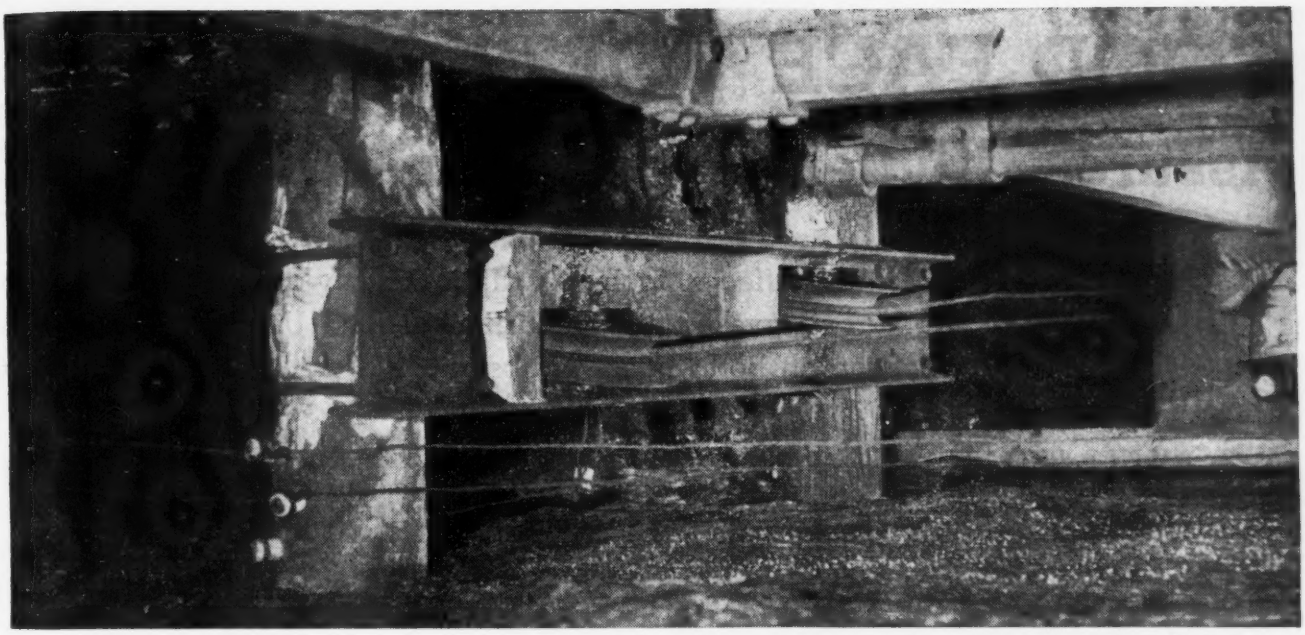
At the loading station a car-spotting hoist is used to move the cars past the shaker loading station. A short distance down the gangway a head-block and a derail switch are set against the cars in case of a runaway. This is a measure of precaution which is observed in all the collieries of The Hudson Coal Co.

In the Twin vein, approximately 20 ft. above the Top Ross vein, are a number of scraper installations. To get sufficient headroom for the operation of the cars in the gangways of this thin seam, especially under the scraper loading chutes, top rock is blasted.

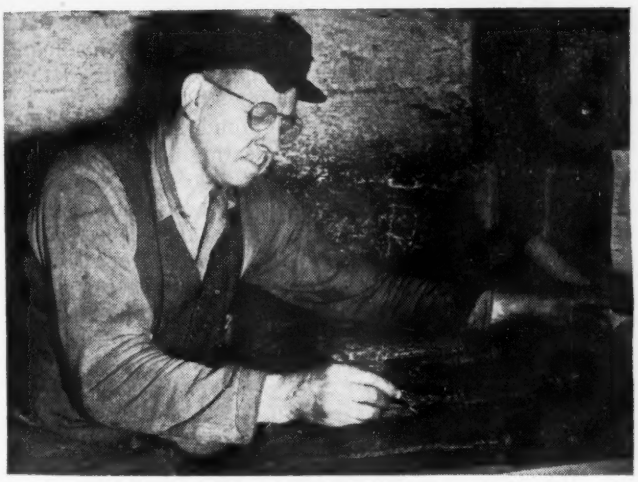
Each scraper installation is manned by a four-man crew consisting of a hoist man, a car-loading man and two men at the face. These crews are driving chambers 24 ft. wide on a contract basis. Coal is mined on the solid, using 15 8-ft. holes to the chamber, about one-half of which are fired at a time. Each fall makes 13 or 14 2-ton cars, which the crew cuts and loads in a shift.

Each scraper hoist (the one appearing in the illustration is a Pneumelectric with a Type CO 1809 General Electric 20-hp. compound-wound 230-volt d.c. motor) is located well back in a crosscut off the gangway. It is stationed where it can serve four or six chambers, half of them to the right and half to the left. The reason for setting it well back in the crosscut is to get at least 18 ft. between the drums and the headframe sheaves. This distance provides a suitable fleet angle. This headframe sheave assembly through which the ½-in. 6x19 plow-steel ropes are threaded is termed the "bridge-tree." The sheaves are installed at a slight angle on the I-beam base to lessen rope wear.

Considerable work is involved in properly setting up the hoist and all the necessary sheaves and anchor posts. But the working life of one location sometimes is as much as six months,



Ropes from the hoist first pass over the sheaves of the "bridge-tree," thence along gangway to chambers on the left.



Fred Tichsler, sectional foreman, studies mine map in underground office.

G. Gerald Blake, special engineer on machine mining, tries out the signal to the scraper hoist from the car-loading station.

and taking the care to make a good installation is considered worth the cost.

All the posts used for mounting the bridge-tree and the various sheaves are hitched in the top and bottom. A chain anchored in the coal or rock also is fastened to each sheave assembly to prevent it from swinging out of position if the post should break.

The wooden loading chute at the mouth of each chamber is equipped with a hinged steel apron to facilitate the loading operation. When the chute is not being used the steel apron is dropped down and under the chute out of the way of any traffic on the gangway.

A 6-volt battery-operated signal system by which the hoist man may be signaled from the loading chute or the face of the chamber makes for efficient control of the complete operation.

Fred L. Zollinger, superintendent of Loree Colliery, at his desk in the newly contructed office building.

GOOD FACE VOLTAGE

Assures Efficient Production at Low Cost

Face Voltage Affects Machine Output Directly and Through Morale of Workers — Investigating Return Side First Usually Best — Then Match Drop on Both Sides — Substations Close to Load Really Pay

By RALPH R. RICHART
Assistant Editor, *Coal Age*

NOTHING will shut down a mine more quickly than a power outage, and nothing will slow down production more insidiously than poor power. Fortunately, poor power offers warnings in various forms and these warnings should be heeded by a thorough check of circuit conditions, by bettering circuit capacity, and by keeping generating units close to the load centers. The "pulse" of a d.c. power system (the subject of this study) needs to be checked frequently so that timely adjustments may be made to keep the voltage up and maintain production.

Poor voltage usually steals its way in through many openings. It comes about through the cumulative effect of power leaks, grounds; loose, broken or missing bonds, broken rails, high conductor resistance, misuse of copper, overloaded substations and, on some occasions, from the pumping action of sectionalizing and circuit breakers. Study of this list leads to the conclusion that the transmission system is the major source of much of the trouble. If this be true, then many of the causes of poor voltage may be eliminated, or greatly relieved, at a moderate cost of time and money.

Poor voltage is easily recognized. Slower machine operation, decreased production, dimming of lights, that certain stench so easily recognized far down the entry or gangway and the many jobs in the armature shop all point to its existence.

Strangely enough, one of the things about the operation of d.c. motors that tricks many coal men is the fact that, although the voltage may be very poor, d.c. motors have the habit of grinding on and giving the impression they are doing a 100 percent job. If they were to stall, as a.c. motors would do under similar conditions, something would have to be done about the situation. As a matter of fact, the speed of a d.c. motor does fall off as the voltage is reduced. But, since it is not disposed to fall out of step, it accepts a lot of punishment before it is ready to take the count.

What equipment needs—and what real production demands—is voltage at the face to match the voltage stamped on the nameplate of each machine. It is much better to provide a high voltage, if it is not too high, than it is to have a voltage below normal. When the level at the machine falls below the rated voltage—the basis on which the manufacturer has designed the machine—production begins to suffer as a result of the penalties characteristic of bad power.

Poor Voltage Robs

Poor voltage affects production, among others in the following ways:

1. Slower operation of machines with consequent reduction in their capacity to produce.
2. Sacrifice of overload capacity of the machine or its ability to handle peaks when necessary.
3. Machine breakdowns and increased time in the shop for repairs.
4. Demoralizing effect on the machine crew and all others in any way responsible for the mine's output.

Poor voltage also is hard on equipment. Among other things, it:

1. Causes motors and controls to heat.
2. Causes solder to melt, freeing band wires and permitting open circuits to develop in armatures.
3. Accelerates insulation deterioration.
4. Causes commutator fields and armature windings to be replaced more often.
5. Multiplies commutation troubles.
6. Makes lubrication more of a problem.
7. Causes increased heating of cables.
8. Increases maintenance costs.

Manufacturers usually guarantee standard-voltage motors to operate successfully, but not necessarily in accordance with standard guarantees, at voltages which are as much as 10 percent above or below the nameplate rating. The curves in Fig. 2 show how poor voltage affects d.c. shunt-wound and compound-wound motor operation with respect to speed, torque, full-load current and heating effect. For a given motor loading, as the voltage applied to the motor is lowered, torque and speed decrease, while current and heating effect increase. The heating effect, due to the rapid rise in full-load current, seems to run ahead of everything else. On the other hand, as the applied voltage is raised the effect is reversed—torque and speed increase, while current and heating effect decrease. Therefore, it is important that attention be focused on the undervoltage side of the picture.

The best place to start in improving voltage usually is on the grounded side of the circuit. It is this side of the circuit which is quickly covered up and easily forgotten. Nevertheless, it still remains as important as the live, or "hot," side. By commencing on the grounded side, it is quite possible to effect noticeable improvements in a short while. It also is fundamental that as the system is gone over—as the trouble is found and remedied—the circuits should not merely be "doctored up." All alterations and improvements should be made permanent.

Check Track Circuit

In checking track bonding some type of reliable bond tester should be used, if at all obtainable. If a bond tester is not available it always is possible to fall back on the hands for the detection of warm or hot joints. However, the hands should be protected by gloves at least during the initial inspection of each joint. Sparking and flashing at rail joints is a sign of faulty bonding. A pair of eyes can do much to locate such defective joints and it

is a good plan to ask all motormen, tripriders and tracklayers to watch for and report broken rails and bad joints. When a defective joint is located an appropriate marker should be placed near the spot (either on a prop, the rib, or on the feeder line) to assist the bonder in readily locating the spot.

It may be well to bring out here the importance of giving proper consideration to length of bonds at the time they are purchased. This is especially necessary when bonds are to be applied to the base of the rail, around a splice bar, by the steel arc-weld process. Since the best and easiest welding is flat-position work, all bonds should be long enough to permit the bonder to position the terminals for flat-position welding. Some manufacturers recommend ordering 4/0 bonds 8 in. longer than the splice bar being used. While such a bond can be attached, it sometimes is more convenient to work with a bond still longer, by 2 in. The added resistance of a longer bond can well be tolerated if the extra length enables the welder to fasten the bond more securely to the rail.

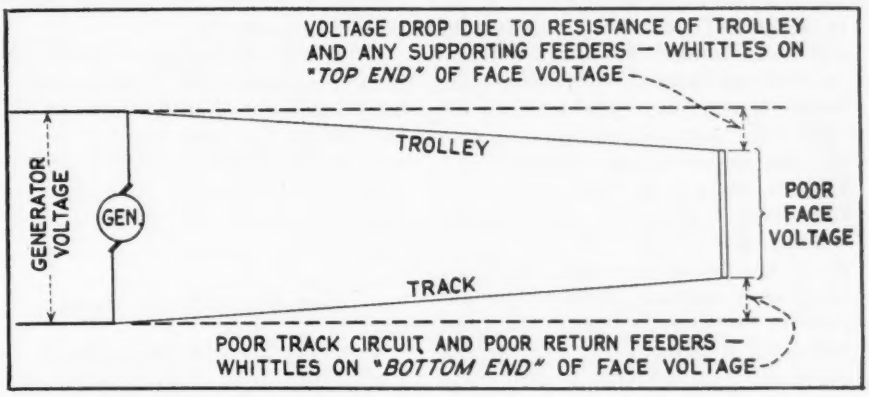
In applying a bond it should be remembered that the end farthest away from the nearest substation furnishing the current for welding should be attached to the rail first. In this way good penetration at each weld is assured. If the procedure is reversed: i.e., if the end of the bond closest the substation is attached first, the return current from the second weld travels back along the new bond instead of taking the shortest path to the rail and the weld is robbed of good penetration at this point.

Bond Both Rails

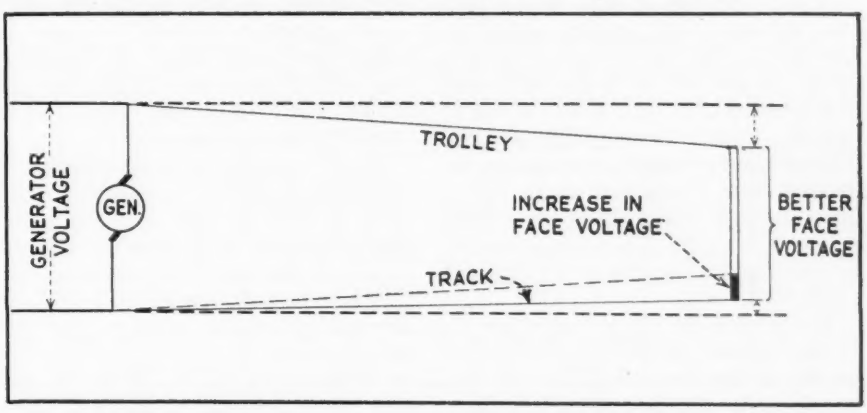
It is customary in practice to install bonds which have 35 to 50 percent of the current-carrying capacity of the rail being bonded. It should be borne in mind that in this discussion both the terms rail and track will be used. When track is mentioned it means two individual rail circuits well bonded and cross bonded. To keep in mind what a rail section of a given weight is equivalent to in terms of circular mils of copper, it is necessary only to remember that a 1-lb. (per-yard) rail section has approximately the same resistance as a copper wire with an area of 10,000 cir.mils. For example, the copper equivalent of a 40-lb. rail is determined by multiplying 40 by 10,000, which equals 400,000 cir.mils (or approximately the rail capacity).

The lower chart in Fig. 3 compares the copper equivalents, in circular mils, of various sizes of bonds (used singly and in pairs) and 40-, 60-, and

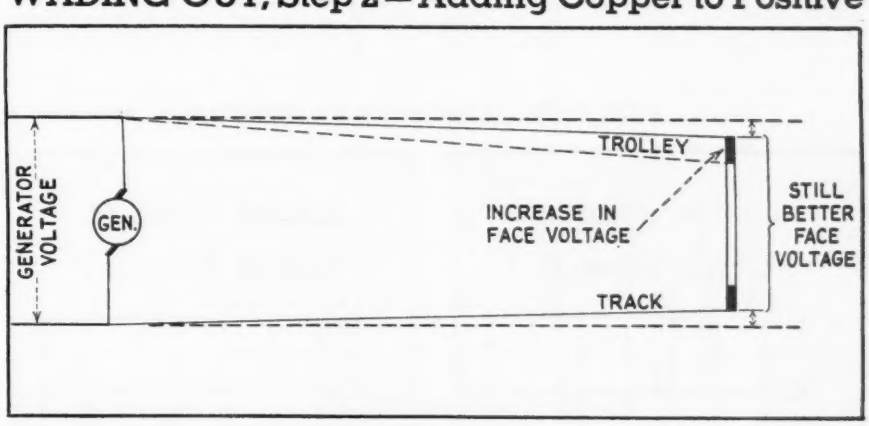
DEEP IN TROUBLE: Poor Face Voltage


VOLTAGE DROP DUE TO RESISTANCE OF TROLLEY AND ANY SUPPORTING FEEDERS — WHITTLES ON "TOP END" OF FACE VOLTAGE
TROLLEY
GENERATOR VOLTAGE
GEN.
POOR FACE VOLTAGE
TRACK
POOR TRACK CIRCUIT AND POOR RETURN FEEDERS — WHITTLES ON "BOTTOM END" OF FACE VOLTAGE

WADING OUT, Step 1 — Improving Return



WADING OUT, Step 2 — Adding Copper to Positive



WADING OUT — Moving Generator

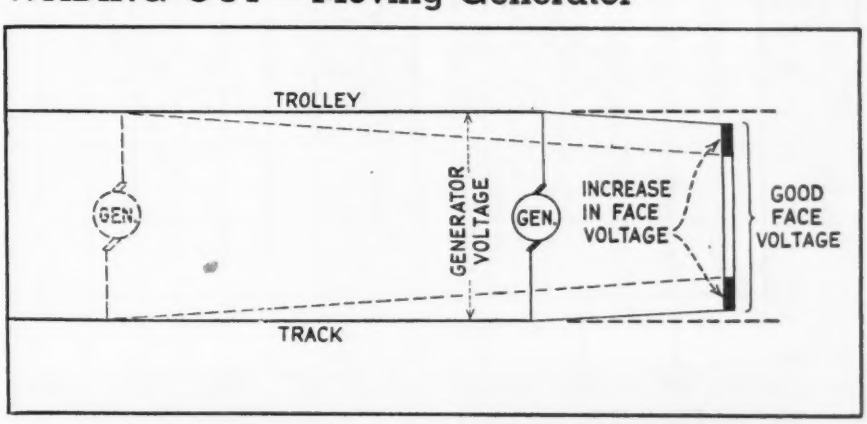


Fig. 1—Low voltage at the face can be rectified by improving the return, adding copper to the positive and—always good—moving substation closer to the load center.

80-lb. rail sections. The upper chart in Fig. 3 shows the resistance for a 1,000-ft. section of track (two rails bonded and cross bonded) for three different rail sections bonded with various size bonds. Using the vertical scale on the right, these same curves show the voltage drop or loss which will result in a 1,000-ft. section of track for a 100-amp. load. These curves point up the fact that bonding up to the full capacity of the rail section does not bring about very marked results. The important thing is to bond each joint and keep it bonded. As long as the bonds show no tendency to heat there is not much to worry about as far as the rail return is concerned.

Cross bonding as well as ties with any auxiliary track feeders should be checked at the same time a check is made on the bonds at the individual rail joints. Here again the question of length deserves some consideration. Manufacturers sometimes recommend buying cross bonds 4 to 6 in. longer than the gage of the track. Very often a longer cross bond is more desirable, especially from the standpoint of bond protection.

Quite often cross bonds are attached to the rails and are left lying like snakes on top of the ties and ballast. In this position they are open to attack from numerous directions and eventually suffer damage if not total destruction. A broken and frayed cross bond, with ends rearing in the air, presents an unsightly picture—and should be replaced immediately.

It is possible to give a cross bond good protection. Fig. 4 shows how a tie is used for that purpose. In this installation the cross bond is made a part of the electrical tie between the track feeder and the track circuit, and also serves as the conventional tie between rails.

Not Over 150 Ft. Apart

Cross bonds ordinarily should be spaced not over 150 ft. apart and should be made of at least 4/0 copper. The electrical tie between the track circuit and the paralleling track feeder generally should be made at every other cross bond: i.e., at intervals of 300 ft. Cross bonds become all the more important when breaks occur in the rail circuit.

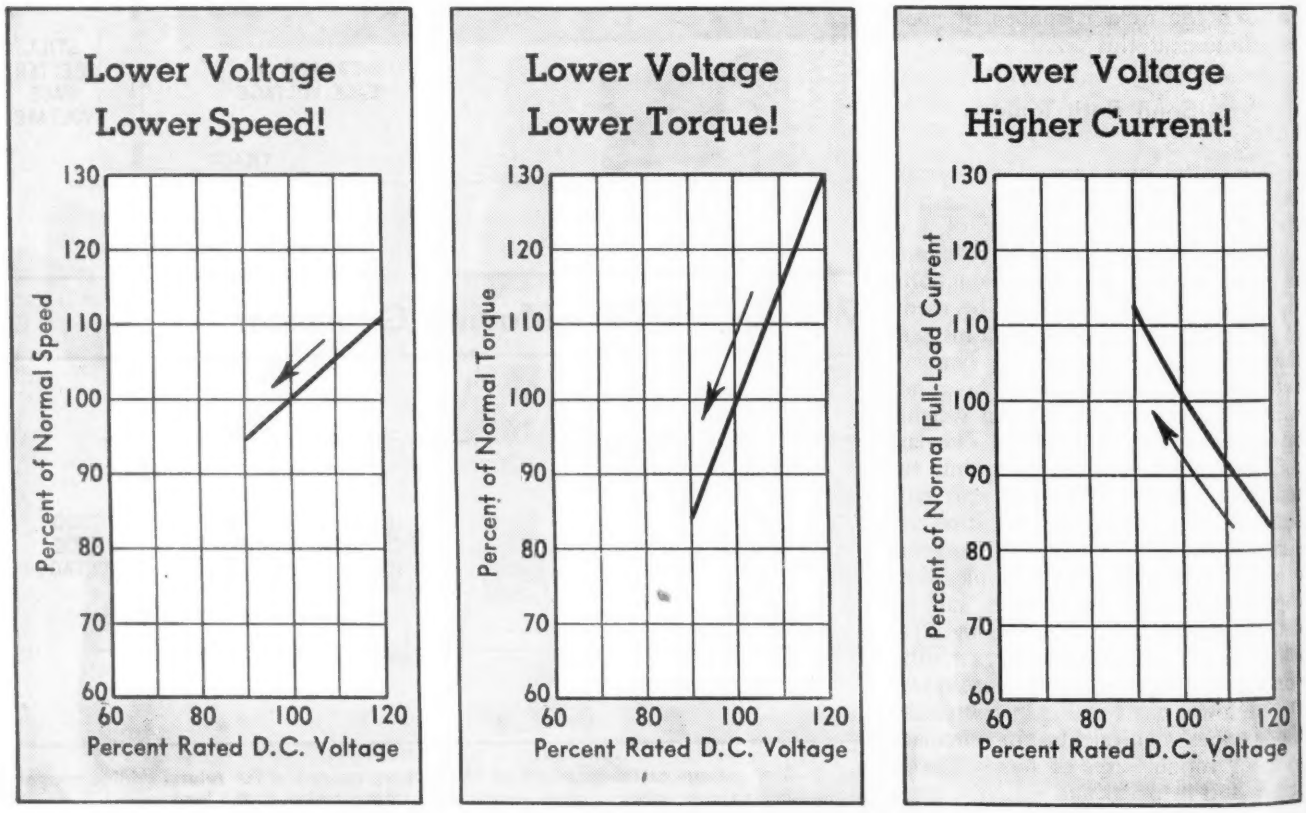
Good bonding around turnouts is essential. Main-line turnouts are sometimes double bonded as a safeguard against trouble from derailments and excessive vibration from pounding at the switches. In panel entries it is common practice to bond the straight or continuous rail only. Cross bonds are used around room switches to connect the straight rail of the entry track to both rails going to each room. About every third room the straight rail of the entry should be tied in with the track feeder running up each panel entry of the territory. Track bolts on the room track should be kept tight to enable the fishplates to shunt the current around each joint.

Aside from jumpering the rail circuits to the return feeders along the panel entries of the territory, one more step can be taken to improve the overall effectiveness of this return network. Connect the track return feeder of one entry to that of the other entry by a jumper through the last open crosscut. This parallels the return circuits of both entries and gives the entire territory a so-called ring-return circuit.

Track circuits when properly bonded inherently have a relatively high current-carrying capacity, but even so, at many mines they are supplemented with copper return feeders. These feeder circuits are generally strung up where they are easily inspected. Bare stranded 500,000-circ. mil cables are not uncommon along main-line haulageways; while in panel entries bare solid 4/0 wire generally is used. The 4/0 solid wire lends itself to clamping on machine nips.

When bare stranded cables are installed along the main entries it is a good plan to tin a 12-in.-long section of the cable (all the way through) every 300 ft. wherever a connection to the track circuit is contemplated. This should be done while the copper is still bright and shiny, for in this

Fig. 2—How voltage affects the performance of shunt- and compound-wound motors.



way a good contact with each strand of the cable at this point is assured for all time. If the spot isn't prepared in this manner to begin with the copper soon tarnishes. Then, rock dust settling on the cable draws moisture to aid corrosion, making any connection thereafter less effective and much more difficult to make.

With 4/0 solid wire it is not necessary to tin the wire, for it can be readily cleaned with a file when a permanent or semi-permanent connection is to be made. Instead of properly tying the return feeder to the bonded rail in the panel entry it sometimes is spiked against the base of the rail. Such a contact cannot remain secure very long. Unless the wire remains tight against a clean spot on the rail the return system in that territory will not be doing all that it could.

Match Both Sides

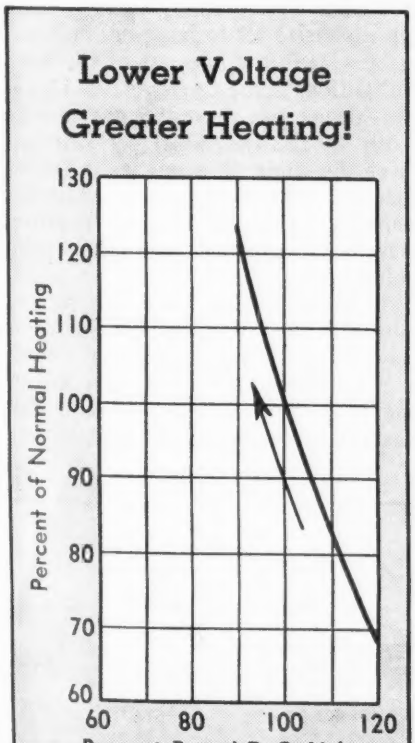
So far, all attention has been directed to the grounded side of the circuit. But a quick glance at the curves in Fig. 5 will show that one 40-lb. bonded rail has more carrying capacity (less drop for a given load) than a 350,000-cir.mil trolley wire (generally designated as 6/0). This suggests that after both rails have been carefully bonded and cross bonded attention should be transferred to the other side of the circuit.

Ordinarily the copper on the positive, or trolley, side of the circuit is erected and maintained in fair shape. Its condition, as far as continuity of circuit is concerned, can be established by visual inspection alone. Also, this is one side of the circuit that can be quickly checked for heating; it is not necessary to wait until the trolley wire begins to sag before it is apparent. Usually the appearance of the wire is a clue as to whether or not it has been heating. Feeling the wire, of course, is the most certain method, but this is only for those who are familiar with the precautions to be taken.

If the trolley wire is backed by feeders there should be an electrical tie between them every 300 ft. A stranded conductor, 4/0 or larger, makes a suitable tie.

With the track properly bonded it is a simple matter, by use of the curves in Fig. 5, to pick off the amount of copper that will give approximately the same drop on the positive as on the negative side of the circuit. For example, it would take a 300,000-cir.mil trolley plus a 500,000-cir.mil feeder to match the drop in a well bonded 40-lb. track circuit, or it would take a 4/0 trolley plus two 500,000-cir.mil feeders to match the drop of a well bonded section of 60-lb. track.

After the carrying capacity of both sides of the circuit have been matched and there is still too much drop along the way there remain two alternatives:



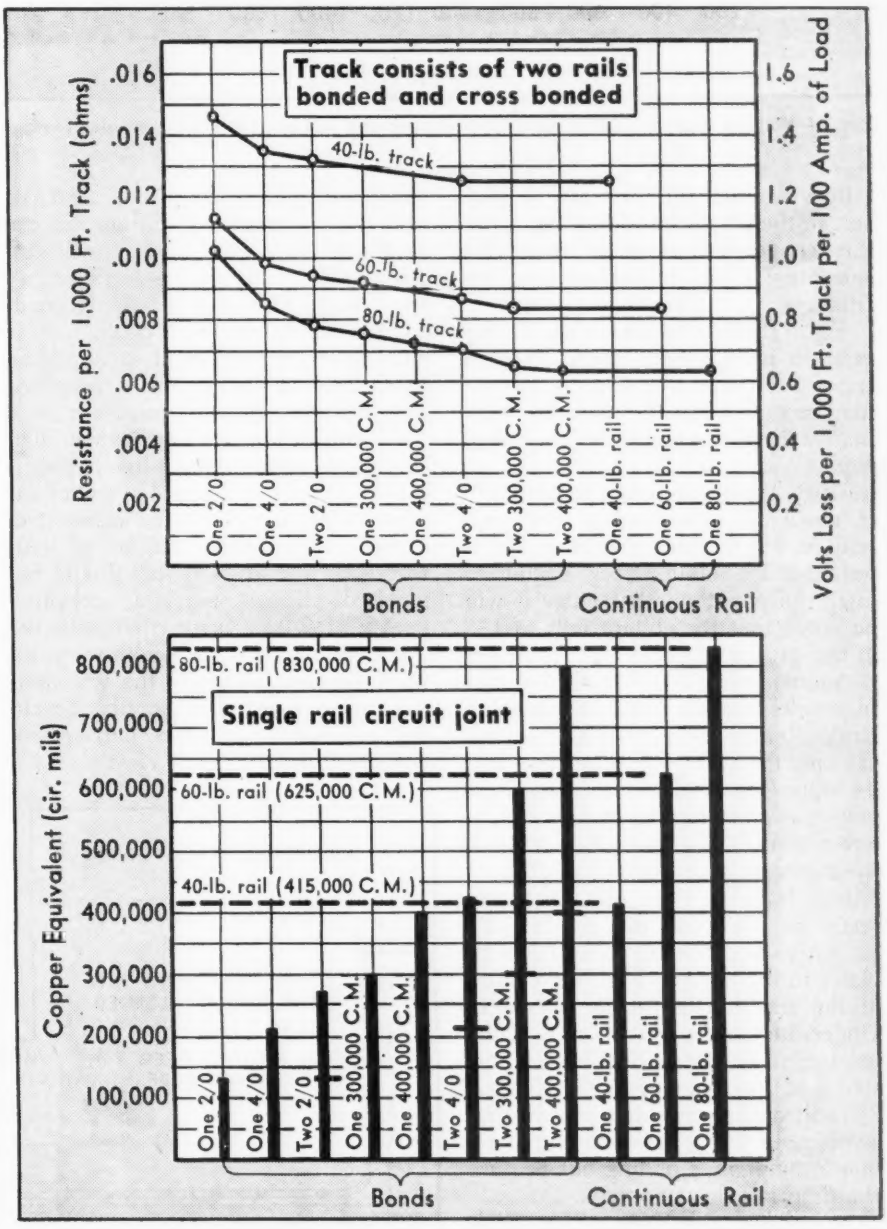


Fig. 3—Lower chart compares copper equivalents for rail bonds (used singly and in pairs) and three typical rail sections. Upper curves show the resistance and voltage drop for a 100-amp. load over various 1,000-ft. sections of track (both rails bonded and cross bonded). Ratio of rail to copper resistance is assumed to be 12:1.

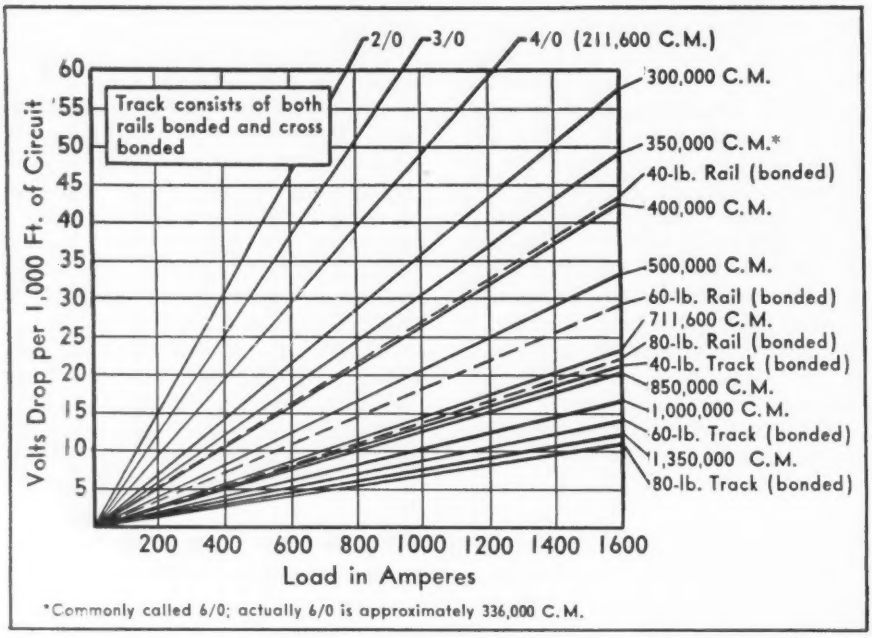


Fig. 5—Voltage drop in 1,000-ft. lengths of copper and rail conductors for various loads.

either increase the capacity of each side of the circuit by adding the necessary copper in feeders or move the substation closer to the working territory.

Fig. 6 shows a condition which may exist in many mines today. It illustrates how poor the territory voltage may become when the main-line locomotive leaves the parting with a loaded trip.

With the nearest substation 1,900 ft. down the main haulage entry and with a 350,000-cir.mil trolley and a well bonded 60-lb. track circuit to carry the power on that entry it will be noted that the voltage falls to 156 at the cutting machine (*F*).

Adding one 500,000-cir.mil feeder in parallel with the trolley on the main haulage entry (between points A and C) cuts the voltage drop on that line 44 volts. This means that the system voltage is improved by 44 volts and, as a result, that the voltage at the cutting machine has been boosted to 200.

By leaving the 500,000-cir.mil feeder in place and moving the substation to Location *B*, some 1,350 ft. closer to the territory load, the voltage at the machines is further improved. Under the same condition of load the voltage at Cutting Machine *F* now stands at approximately 237. Even a 250-volt cutting machine can weather a voltage of this figure while the main-line locomotive is pulling out because the drop is only temporary.

Experience has shown that it is well to keep substations within 1,200 to 1,500 ft. of the territory being worked, while sets serving the main-line haulage load normally should be spaced not more than a mile apart. It also is good practice to install feeders in the positive and negative sides of the power circuit throughout the entire mine. This will be appreciated when a substation set is down for repairs and the equipment in a particular section of the mine has to depend on other substations for power.

As entries are developed, especially those to be used for main-line haulage, it is customary to string 4/0 trolley in 200- or 250-ft. sections for locomotive service. That many sections of 4/0 wire with attendant splices should be replaced when as much as a ½-mile stretch of 6/0 or larger trolley can be installed. This will help improve voltage conditions all along the way and release the 4/0 trolley for new development work. It saves cutting so much 4/0 wire.

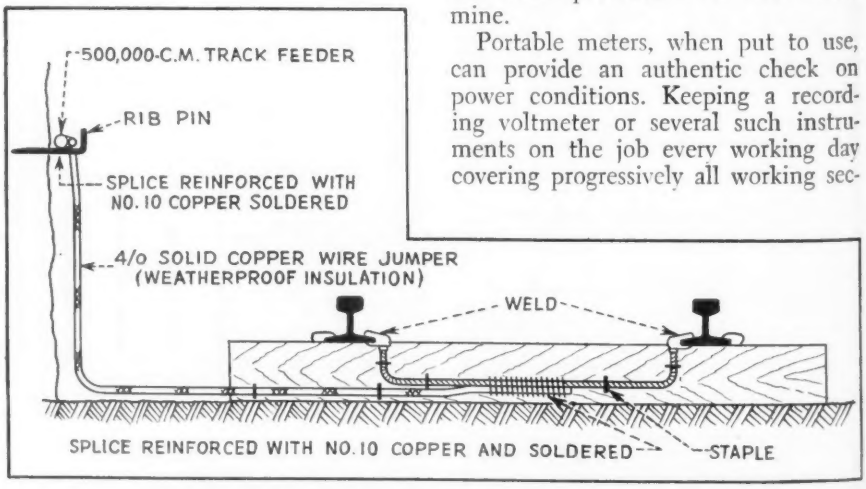

500,000-C.M. TRACK FEEDER
RIB PIN
SPLICE REINFORCED WITH NO. 10 COPPER SOLDERED
4/0 SOLID COPPER WIRE JUMPER (WEATHERPROOF INSULATION)
WELD
SPLICE REINFORCED WITH NO. 10 COPPER AND SOLDERED
STAPLE

Fig. 4—One method of protecting cross bonds, showing also method of making an electrical tie between a 4/0 cross bond and a 500,000-cir.mil track feeder.

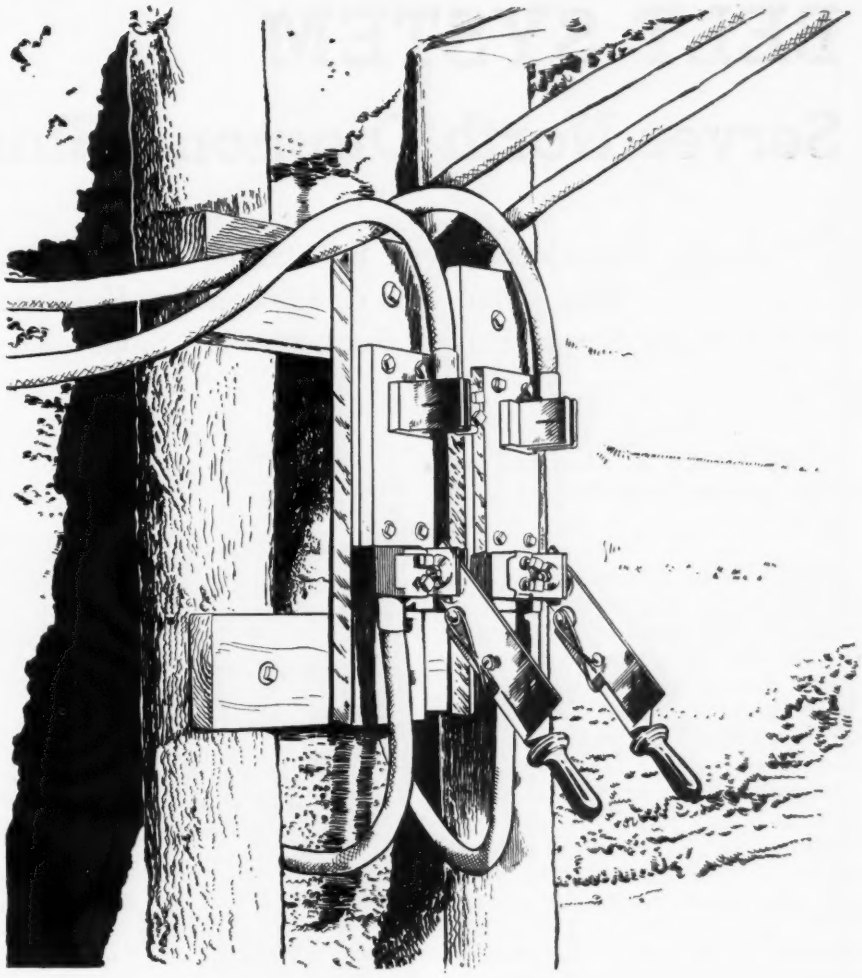
Occasionally, feeder switches (knives), such as shown in Fig. 7, begin to heat under normal load conditions. Such heating is power wasted. The heating may be due to poor contact pressure at the hinge end or at the contacts. Rock dust may be partly to blame or the switch may need tightening a bit. A little bench servicing probably will put the switch in shape again. One feature worthy of note in connection with the method of mounting of the feeder switches shown in Fig. 7 is the arrangement of the wooden braces. The insulated base is first bolted to a vertical wooden member and it in turn is bolted to the wooden cross braces spanning the space between the posts or props. With this arrangement any strain resulting from prop movement is taken by the vertical member rather than by the somewhat more fragile insulated base of the switch.

Load Distributor Helps

Load distributors on motor-generator sets offer a big aid to overcoming the pumping action of circuit breakers at overloaded substations and sectionalizing points. If an overloaded substation can be kept on the line and made to furnish its full load current rating, but at reduced terminal voltage, to help a main-line motor and its trip get started to the bottom, a serious power outage may be averted. For that matter, a series of outages may be averted. This automatic field reducing device for generators helps an undersize set to hang on and carry a safe load until the rest of the mine substations come to its rescue. Use of this device can prevent many outages both in the individual sections and over the mine as a whole. It is particularly effective if plenty of feeder capacity, both positive and negative, has been provided over the entire mine.

Portable meters, when put to use, can provide an authentic check on power conditions. Keeping a recording voltmeter or several such instruments on the job every working day covering progressively all working sec-

Fig. 7—How 1,000-amp. feeder switches can be mounted to relieve the base of strain.



tions, round after round, will put a stop to the loosely used bad-power remark sometimes employed on section reports to cover up other shortcomings. A complete record of charts kept up to date serves either to defend or denounce the claims of the mine electrician regarding the sort of a power job he is providing. It goes without saying that such charts would be useful in pointing out the need for more copper and perhaps more substation equipment.

Charts Tell the Story

Load charts for substations, taken occasionally, may uncover opportunities such as a change in load conditions making it possible to switch two portable substations, of unequal ratings, to provide better all-round power service.

Production in a territory is influenced by the degree of good or poor voltage maintained at the face. A check beween the loading reports and the voltage charts will bear out this fact. Thus it may be concluded that voltage regulates machine speed and machine speed in turn sets the working pace for the whole territory. When voltage is improved the morale of the working crew also is improved. Men like to operate equipment which can walk right along with the job it has been assigned to do. However small the increment of voltage improvement turns out to be, it has a far-reaching effect—for in the end the improvement is reflected in the cost statement. The extent of this reflection is a measure of the thoroughness of the job done.

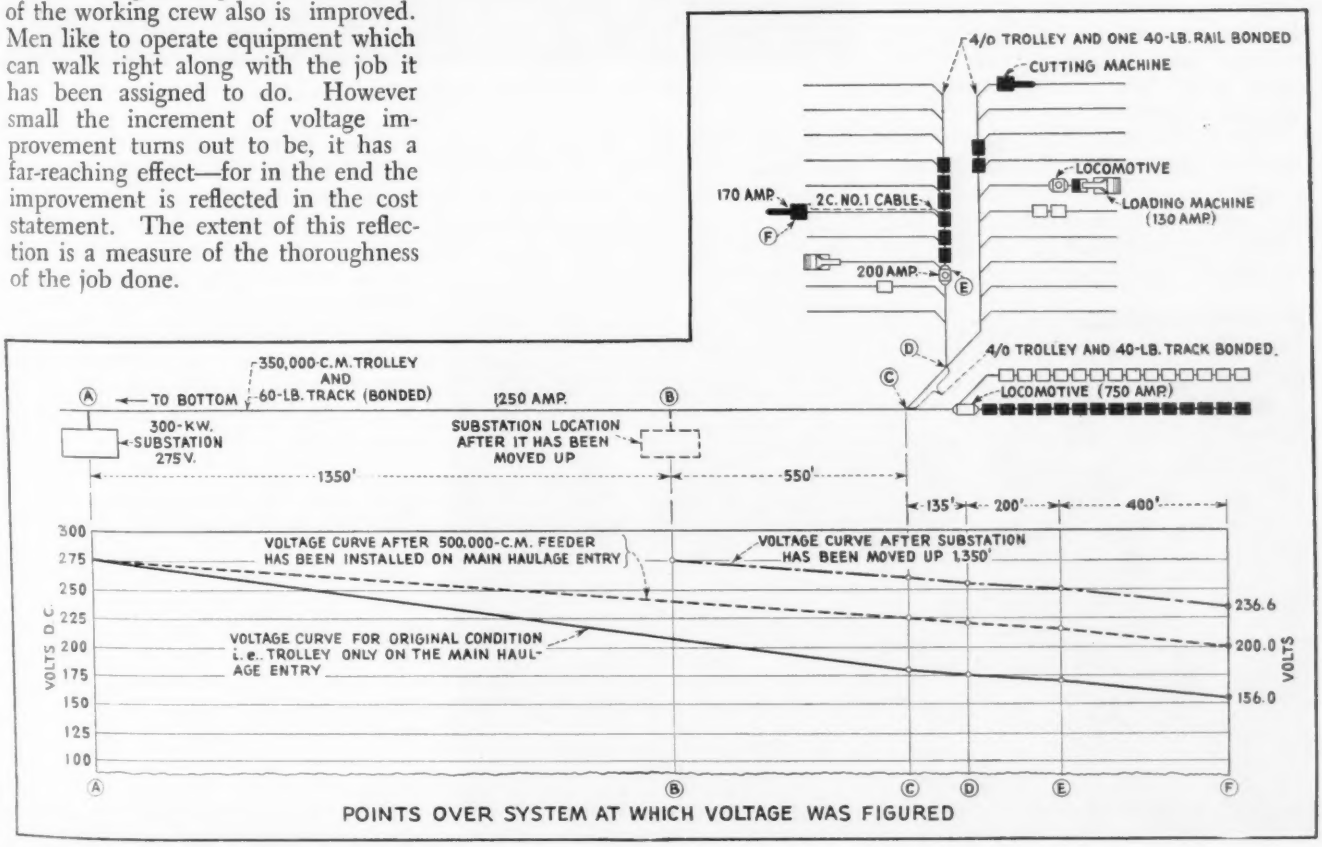


Fig. 6—How face voltage in a territory can be improved by adding copper and moving the substation.

BELT SYSTEM
Serves North Diamond Shuttle-Car Mine

Loaders Served by Shuttle Cars Average 400 Tons per Shift in 6-Ft. Coal—Main-Line and Secondary Haulage Handled by Belts to 120-Ton Surge Bin at Foot of Belt Slope—All Belts Electrically Protected

By RALPH R. RICHART
Assistant Editor, *Coal Age*

Shuttle car discharging directly to a 30-in. cross-entry belt.

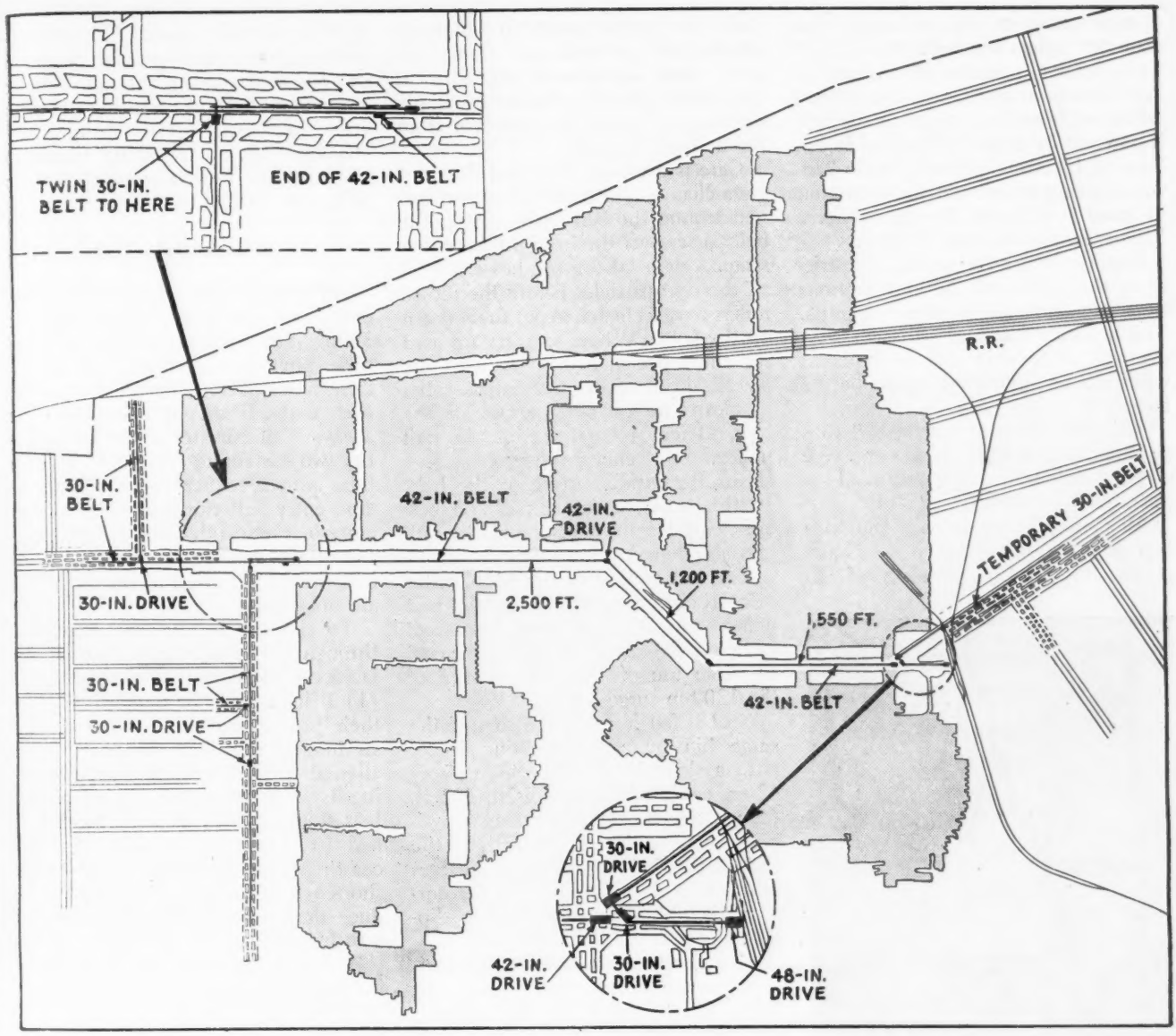
AN ALL-BELT haulage system, with its component sections electrically interlocked and operating at speeds of 300 to 500 f.p.m. transports nearly 5,000 tons in two-shift operation at the North Diamond No. 2 mine, West Kentucky Coal Co., Earlington, Hopkins County, Ky. This operation, whose early stages were first described in *Coal Age* in July, 1941, uses belts ranging from 30 to 48 in. in width to move coal from the various shuttle-car discharge stations out to the washery, more than a mile away. A 120-ton bin, ahead of the 48-in. slope belt, prevents short delays in the tipple from stopping the underground system, or vice versa. Because of wartime restrictions, two sections, or 3,700 ft., of the 42-in. main entry belts were installed on wooden supports.

The No. 11 seam being mined is a medium hard bituminous coal and averages 6 ft. in thickness. It is separated into three benches by a thin band of sulphur about 18 in. from the top and a 2-in. clay parting about 2 ft. above the bottom. Above the coal, gob or slate varies from zero to 10 in. A layer of limestone averaging 4 ft. overlays the seam. Bottom is of fireclay, made soft in some places by water.

Coal on a 30-in. belt approaching point of transfer to 42-in. belt line.

Panel and cross-entry belts, consisting of Jeffrey 52-B or Joy 3-BC units, serve the shuttle-car discharge stations. Belts 30 in. wide, made of 5-ply 32-oz. material, travel at 400 f.p.m. over 1⅞-in.-diameter rollers. Each belt can handle 320 tons per hour. Special impact idlers are not used at any of the loading points, since the coal tumbles only a short distance as it is discharged from the shuttle car onto the belt.

The 400-f.p.m. belt is sufficient to prevent spillage at the loading points. However, a low skirt-board, supported from the conveyor frame, prevents some coal from rolling off the far side of the belt at the loading point. Despite the fact there is at least one side-loading station in each territory, where the coal is discharged to the belt without being given any motion in the direction of the belt travel, the belts show no signs of unusual wear. Very little segregation of the coal takes place as it is dropped from the shuttle cars and the fines, therefore, get some chance to protect the belt. When the panel or



How North Diamond No. 2 is served by 30- and 42-in. belt units to foot of belt slope.

cross-entry belts discharge onto the mains, chutes direct the coal in the direction of travel of the main entry belts.

Panel and cross-entry belts are extended in 300-ft. sections (600 ft. of belt). Either a No. 1½ or 2 Flexco splice, or a No. 405004 Goodman mechanical splice, is used in joining the belts. The longest single section of 30-in. belt installed thus far measured 2,665 ft. from head to tail shaft, and operated on an uphill grade of 1½ percent. Motors for the 30-in. belts range from 25 to 50 hp., with some operating from a 250-volt d.c. supply and others operating from a 3-phase 60-cycle 220-volt a.c. supply.

Coal from the various 30-in. belts is dumped onto the 42-in. 5-ply 42-oz. main-entry belt line. There are three sections to this belt line (1,550, 1,200 and 2,500 ft.) operating in tandem over a distance of one mile. The speed

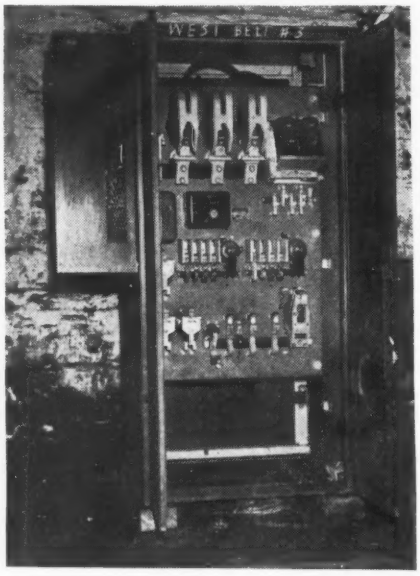
How chutes are employed at transfer points to feed coal onto receiving belts in the direction they are moving.

of each section is 500 f.p.m. and 4-in.-diameter rollers are used throughout. Each section consists of an endless belt vulcanized by experienced splicers called out from the factory. Each belt is powered by either a 75- or a 125-hp. General Electric 3-phase 60-cycle 220-volt slip-ring motor and the reduction in speed is obtained through either a Falk or DeLaval speed reducer.

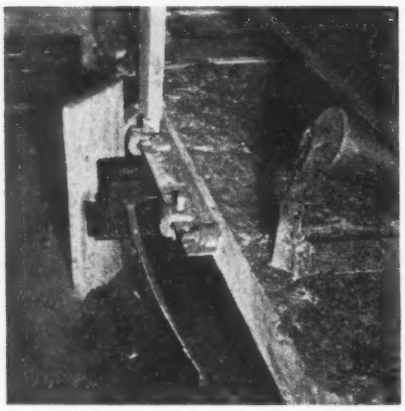
Because of wartime material restrictions, the 1,200- and 2,500-ft. sections were mounted on wooden supports. This wooden framing, although serving well at present, will be replaced when steel supports can again be obtained.

This belt line can handle 890 tons per hour and, if all three sections were stopped fully loaded, it would hold approximately 140 tons.

All conveyor sections are laid to a line surveyed along the entry. Going to this trouble, the operating officials



The starter cabinet shown here is part of the facilities for one section of the 42-in. main-entry belt system.



The roller switch (left of conveyor frame) prevents next belt from starting until the belt it protects is up to speed.

state, has meant much in obtaining satisfactory performance from the belts. Any adjustment necessary in the vertical plane is obtained by simply blocking up under the conveyor from the floor of the entry.

Care is exercised that coal does not get a chance to become caked and carried around the belt again. After the belt passes over the head pulley, either scrapers or revolving brushes clean off all the coal particles before the return rollers have a chance to pat them down on the belt. Where scrapers are used six chevroned-shaped units used are placed ahead of the first return roller to clean the carrying surface of the belt. Then, just ahead of the tail pulley, one chevron-shaped scraper cleans the inside surface of the belt. In this way the surfaces of the belt are cleaned continuously and the pulleys also remain clean.

The last section of the 42-in. entry belt discharges onto a shuttle belt which the operator runs back and forth as necessary to distribute the coal to make use of the full capacity of the 120-ton surge bin.

Coal is fed from the bottom of the surge bin by a reciprocating feeder onto a slope belt. This 48-in. 5-ply 42-oz. endless belt, measuring 402 ft. (c.-c.), operates at 300 f.p.m. over 5-in.-diameter rollers. The belt, at the end of the 16½-deg. slope, discharges into a wet cleaning plant on the surface. A 50-hp. General Electric slip-ring motor drives the slope belt.

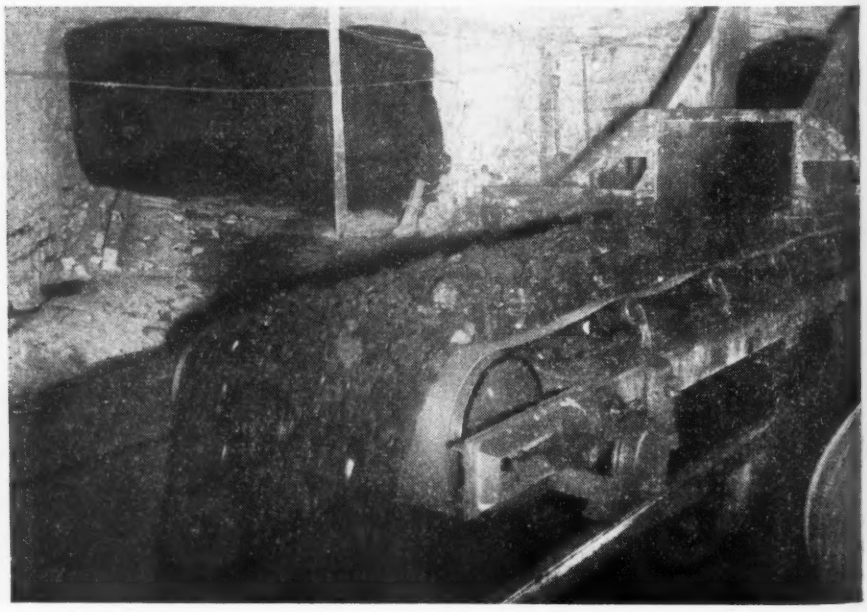
The electrical control for this conveyor system affords protection to the belts, adds stability to the system's operation and includes many safety measures. For all 50-hp. and larger slip-ring motors, General Electric automatic starters, which provide two steps of resistance starting through definite timing before short-circuiting the rotor rings, are used. This insures easy starting without sacrificing torque, a characteristic especially needed when belts are started fully loaded.

Belts Interlocked

All belts, beginning with the 42-in. entry belt which discharges onto the 54-in. shuttle belt over the 120-ton surge bin on the bottom, are electrically interlocked. After this belt has been started by an operator—and there always is an operator at this station—the two remaining entry belts start in their proper sequence. No panel or cross-entry belt can feed onto a main entry belt unless that belt is running—and it will not be running unless all belts in the direction of the surge bin are operating.

To give the belt system protection through electrical interlocking, several factors were taken into consideration: (1) Belts were to be made to start in their proper sequence or order; (2) an intermediate belt was not to be allowed to start until the belt preceding it was up to speed; (3) when one belt stopped, then all belts feeding it had to stop automatically; (4) the coasting time of the belts had to be shortened as much as possible to reduce the possibility of spillage at the transfer stations.

At North Diamond No. 2, an intermediate belt cannot attempt a start until the starter for the preceding belt drive has actually operated to the extent that, electrically, it is possible for



This shuttle belt feeds coal into a 120-ton surge bin at the foot of the belt slope.

the motor to attain full running speed; i. e., all resistance of the rotor circuit must be shunted out and the slip rings of the motor actually short-circuited. When the motor is directly across the line, a normally open interlock (contacts open when the operating magnet is deenergized) on its starter closes one gap of the circuit to hold off starting of the next unit. Because of the excessive drop in voltage along the lengthy control circuits, some of the No. 12 wire circuits being 2,500 ft. long, a special relay is used to shorten the respective coil circuit of each starter. This sensitive relay bridges the 2,500-ft. gap and allows the indication to be transferred with the minimum drop in voltage, all of which adds to the effectiveness of the entire control job.

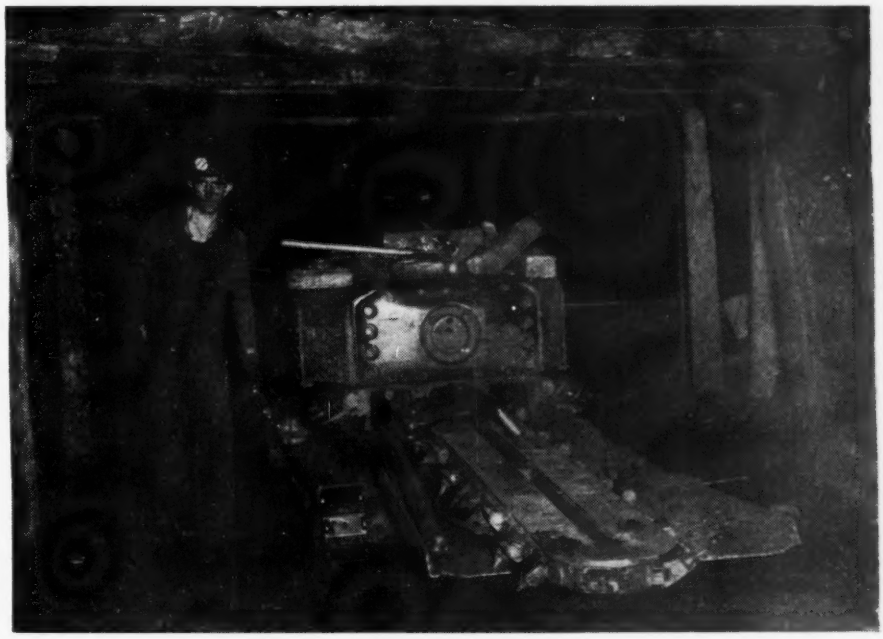
After the motor is across the line, a further interval of delay is necessary for the belt to reach its ultimate running speed. This delay is achieved through the use of a General Electric rotary-type switch. This switch has a roller or disk which bears against the carrying surface of the belt as it travels over the return rollers. The roller of this switch must be turning at a definite speed before the contacts of the switch snap closed to close the last gap in the starting circuit of the next main-entry belt.

In case of the 30-in. belts, besides the interlocking already mentioned, knife switches at the loading and discharging points must be in before they can start.

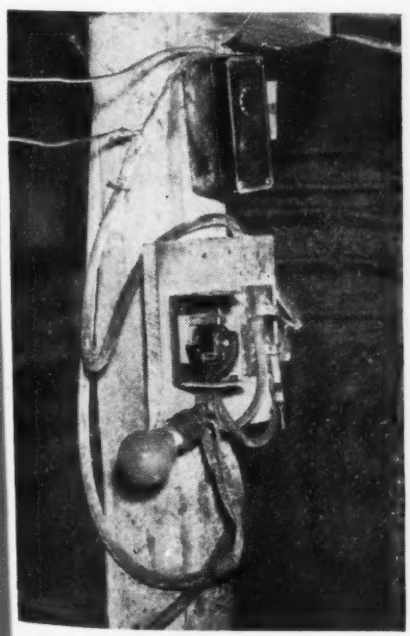
During the starting sequence the rotary switches afford plenty of time delay to prevent the piling up of coal at the belt transfer points, but it would be disastrous to depend upon this same device when shutting down the belt system, especially if it were fully loaded. Here is where the normally open interlock on each starter, already mentioned, passes the stop signal from starter to starter before the rotary switch has time to slow down enough to pass along the same indication. Since their contacts are wired in series, both must be closed for starting the next unit, but the first to open its contact passes along the stop indication.

To promote safety, the entire starter layout has undervoltage rather than undervoltage release protection. After a power interruption the operator must restart the system. To eliminate much of the underground wiring, many of the a.c. powered conveyors are fed individually through bore holes from a distribution system on the surface.

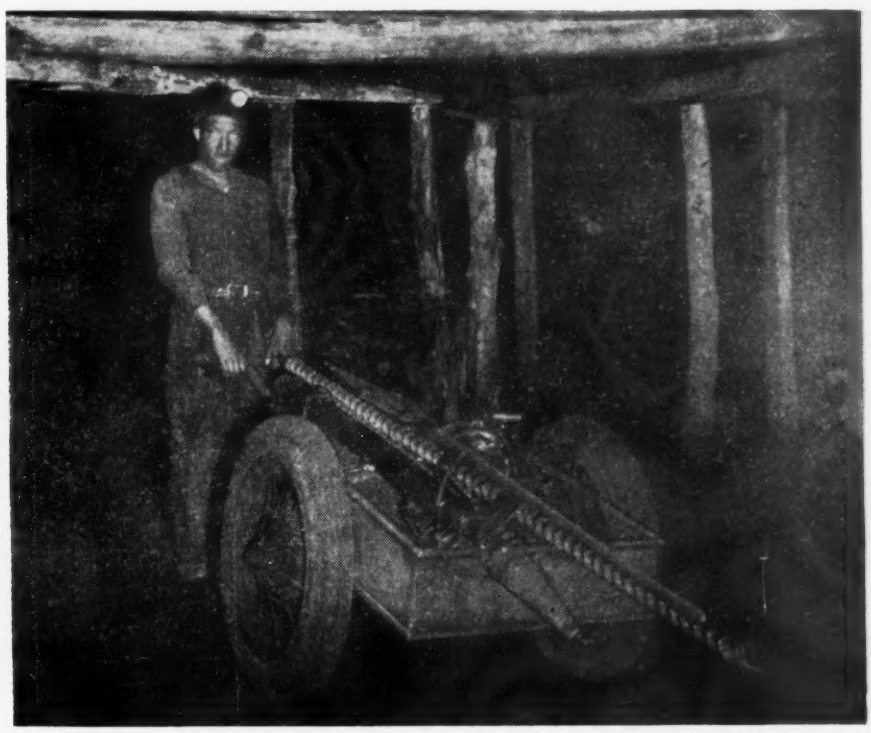
The room and pillar system of min-



Cutting machines are transported on crawler trucks of the type shown here.



This sensitive relay (cover removed) is used because of distances between starters.



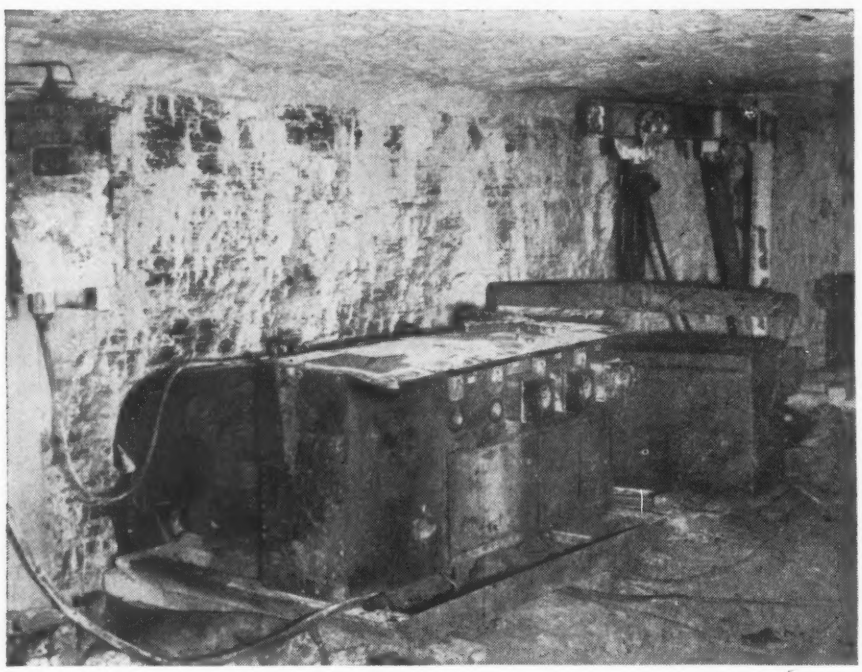
Drillers are provided with rubber-tired trucks for moving their equipment.

ing is used with four or six rooms as standard for a territory. The two center places are designated as the key rooms. Rooms are 30 ft. wide and are driven 300 ft. deep on 45-ft. centers. The timbering of each room is maintained abreast with the loading operation. At the face three 4x6-in. crossbars 27 ft. long on 3-ft. centers are supported by Simplex roof jacks. Behind this area in the key rooms, at intervals of 3 ft., a 4x6-in. crossbar 14 ft. long, on one rib, is held by three props and along the opposite rib is set a single prop with a 3x5-in. header 24 in. long. In the other rooms the face timbering is the same, but the rest of the timbering consists of individual props and headers, four abreast with 3-ft. intervals between rows. Approximately 85 percent of the room timber is recovered after a territory is finished for use in new working sections.

All coal is loaded by seven 14-BU Joy loaders (some held as spares) and each loader is served by two shuttle cars. Of the 14 5-ton shuttle cars, ten are the cable type and four are battery-powered. All shuttle cars are Joy except two Lee-Norse cable units. Each cable car is equipped with 550 ft. of No. 6 two-conductor concentric cable. The battery-powered cars are equipped with Type 24XLAB13 Philco batteries. Joy battery chargers, located near the working sections, charge as many as three 48-cell 300-amp.-hr. batteries at one time.

Average output per load is 400 tons per shift with a 12-man crew, including face boss.

As far as possible, each shuttle car operates in a separate key room. In the case of the cable-type cars this arrangement prevents the crossing of trailing cables. Usually each shuttle car has its own side-dumping point at the belt, but in some cases one car dumps directly onto the end of the belt.



This battery-charging station is typical of those employed at North Diamond No. 2.

Facing the camera in the storeroom are (left to right): Aubin Higgins, safety engineer; Will Cobb, chief electrician; and Roland Lamb, storekeeper.

Shortwall Cutters Used

All cutting is done by seven Sullivan 7B shortwall cutting machines, each equipped with a 50-hp. motor and a 9-ft. cutter bar. Cutter bars are supplied with either Sullivan or Bowdil chains and bits. Each machine carries 300 ft. of No. 2 two-conductor (133 strands of No. 23 wire) concentric cable and each machine is moved around its territory on a Joy mining-machine truck.

Seven Jeffrey Type A6 post-mounted drills with No. 12 Hardsocg augers and bits are used in the preparation of the coal. Six holes are drilled per place, four top and two bottom. The top holes are drilled looking up on 9-ft. centers and are started 18 in. below the natural parting. Bottom holes, 3 ft. above the fireclay, are drilled straight in on 10-ft. centers. All holes are shot with duPont Lump Coal C in 1¾x6-in. sticks. Three sticks are used in each rib hole and two sticks in all the other holes.

Man trips and supplies are hauled inside by rail. The final distribution of supplies in the territory is made by mule and sled.

The officials of the West Kentucky Coal Co., with headquarters in Earlington, Ky., are: Hooper Love, president; Mark Eastin, vice president; Davis Read, general manager and chief engineer; Sherman Melton, chief electrician; and Aubin Higgins, safety engineer. The supervisors at the North Diamond No. 2 mine are: Ray Cobb, superintendent; Volney Wright, assistant superintendent; Thomas Peyton and Carlos Byrum, mine foremen; and William Cobb, mine electrician.

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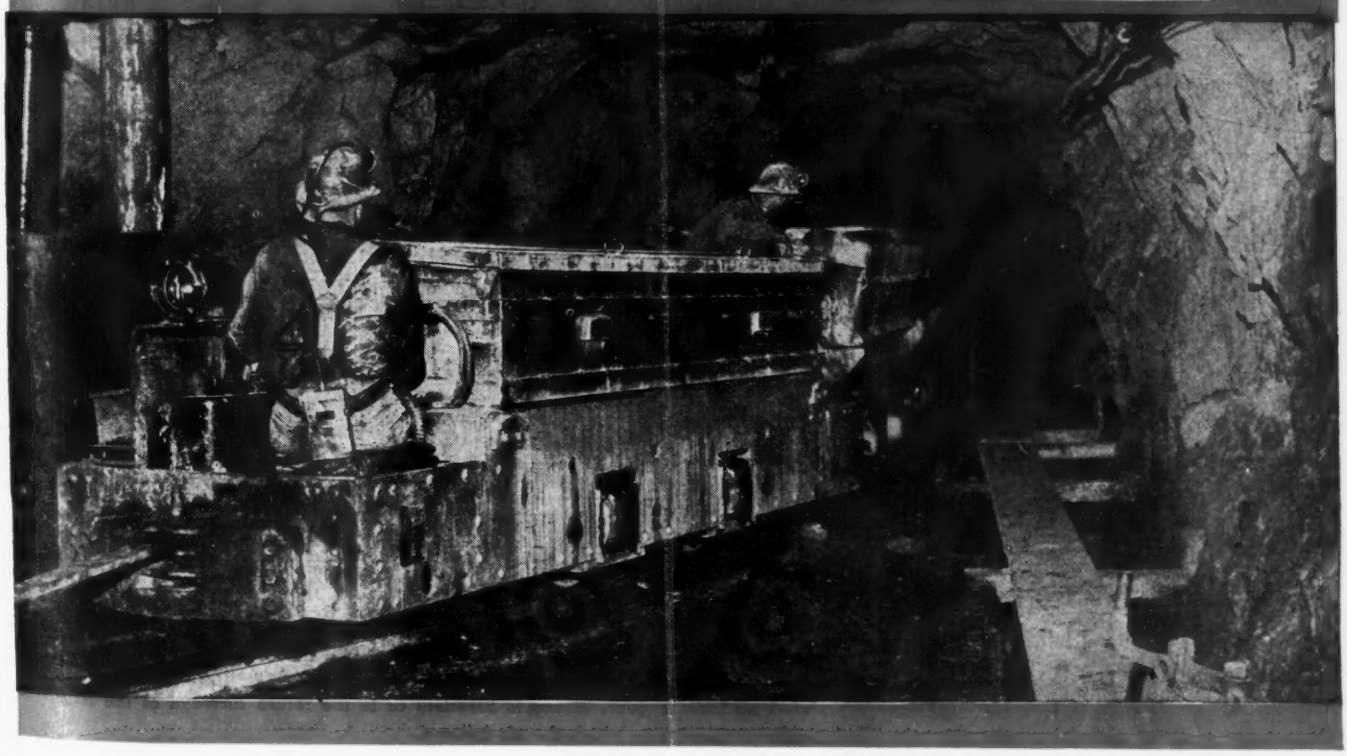


The Foremen's Forum

All Side-Entry Air Returns Through Goaf

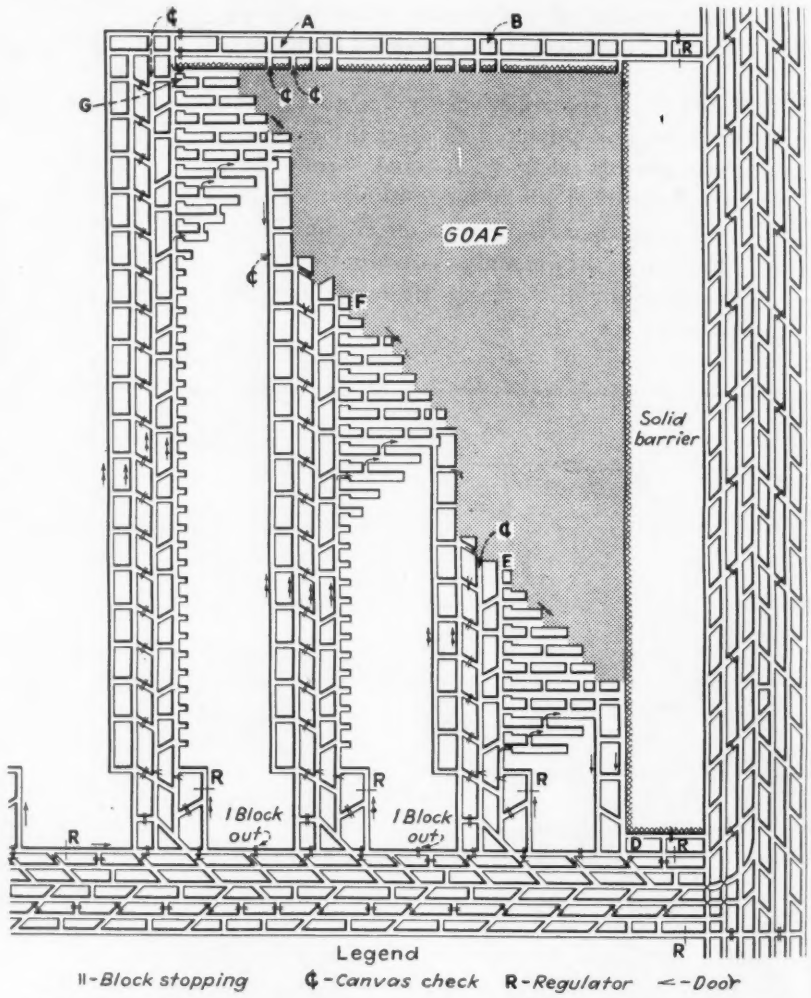
IN AN ARTICLE that appeared in this department in February, p. 124, was described a method of working of the Koppers Coal Div. in which most of the air returns through the goaf, splits being taken off the intake at regular intervals, each split going to only one of several working places and being directed finally not to other working places but to the area where all the coal has been removed. Thereby (1) each working place is given fresh air that has not been befouled with the methane and coal dust of any other working place; (2) an opportunity is afforded to switch any methane accumulation to a place—the goaf—where no electrical equipment or lamps are present; (3) if there should be a mine fire, its flames will go largely where there are no standing pillars to be set on fire and its fumes will travel where there are no men to suffocate or poison or where at least a diversion or diversions are possible; (4) air in traveling will utilize a wide space so that in its travel it will be subject to minimum resistance, thus reducing the high cost of ventilation; (5) perils of the short-circuiting of air will be avoided; (6) much menacing carbon dioxide and methane will be removed.

The passage of air through goafs would do much to remove their methane and carbon dioxide, which always are a menace. The large accumulations found in goafs in general are due to ill-distributed or inadequate ventilation, without definite pressure differences rather than to copious emission of methane, though some roofs contain much of that gas, which is liberated whenever the roof falls. Where the coal is not subject to spontaneous heating, goafs are almost fireproof. They furnish in general, when ventilated, no fire hazard.

Not a Mere Improvisation

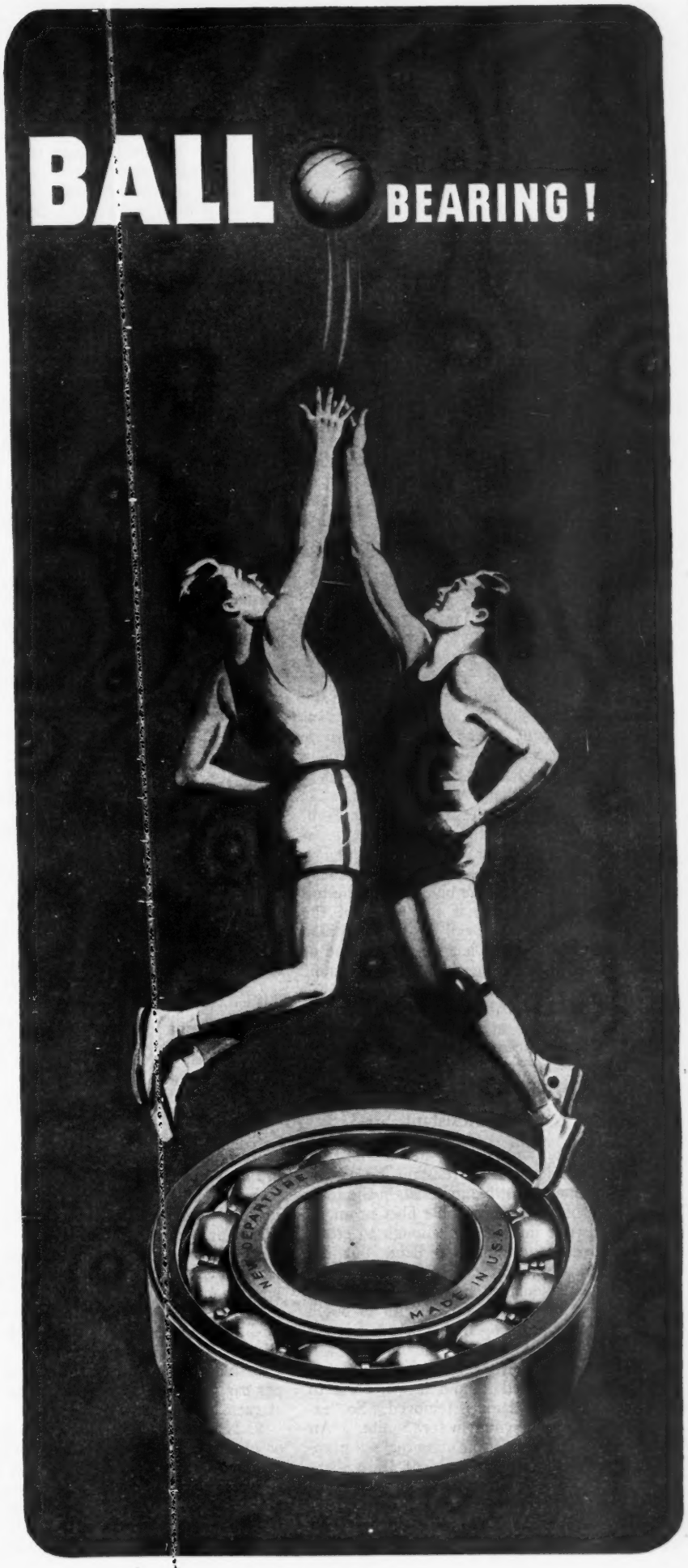
It is well, therefore, that they should be used in the operating scheme. It has taken generations to teach that simple lesson, and it is not learned generally yet, but it is becoming recognized slowly. Bleeders, as stated, have been used for many decades, but at first only as an occasional methane-removing device. Now they are being used and recognized as part of air splits, and they are fast becoming integral and useful parts of mine planning, serving both safety and economy. To some extent, the change is more in name than in fact, for methane in both cases is moved by movement of air, but, though this is true, a recognition of the real nature of the function and possibilities of the bleeder marks a revolution as much as a revelation. The air passing through a "bleeder" is a "split"; a split saves power, and the air is scaled off as soon as its major work of picking up gas from broken and fallen coal at a working face is done. It does not thereafter make a sightseeing trip around the room entry visiting several working faces, thus getting more and more methanous as it proceeds and carrying that methane back to sparking trolley lines or possibly to nips on such lines, as has been altogether too customary a practice in the past.

A somewhat similar scheme of the Pittsburgh Coal Co., as sketched by J. W. Whittaker, for the National Safety Council's recent meet is shown herewith. Here the air from the working faces enters the goaf and travels back toward the face heading which it enters at A by traveling through the wing pillar of the face entry via the headings of an earlier working entry.



Ventilation plan, using goaf for return, designed by Pittsburgh Coal Co. to assure safer operation of the more usual type of room-and-pillar system. From working face to goaf, thence to bleeders or to the return airways of the face entry is the course which the air follows.

Keep your eye on the BALL BEARING!



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In this layout, during development there are as many intakes as returns in every room entry, but during retreat all the headings are intakes with permanent or variable regulation. No matter if doors are open the ventilation is assured. All the air in this instance passes through the goaf.

A few bleeder crosscuts are provided by which the air in the goaf can pass at *B* and *D* into the return of a face entry toward which the room entries are directed. Normally, the air after weaving in and out of the faces of from 12 to 13 working places would travel to points *E*, *F* and *G* and then, with its methane, enter the motor road at those points where sparking trolleys would be waiting to ignite it.

In the illustration, "One block out" means a regulator of 8x8x16-in. cement blocks, one of which is omitted to pass a limited quantity of air. This leaves an opening measuring 8x16 in. which passes 2,000 cu.ft. of air per minute, keeping the headings that are thus supplied free of accumulations of methane.

•

Given Enough Heat Methane Always Burns

A flame-resistant or flame-retardant material is one that will burn when and where a flame is applied to it, but will not extend the combustion to areas away from the flame and will continue to burn for only a few seconds after the flame is removed. Methane-air mixtures (firedamps) are of that character so long as the methane content is less than 5 percent, but they will burn with extremely low percentages of methane in and around a flame or electric arc. That is shown by the cap on a mine lamp. The blue cap on the top of the yellow flame is the result of the burning of methane; only part of this blue cap is visible. The length and volume of that cap is a measure of the flame-resistant quality of the mixture. Yet, at its tip the temperature probably is above the ignition temperature of methane, because carbon dioxide and excess nitrogen—both fire depressants—are present to aid in restricting the further upward extension of the flame.

Flame-Resistant

Flame-resistant bodies are combustible bodies rendered flame-resistant by adding thereto incombustible material, in the form usually of an incombustible fiber or an incombustible impregnant, enough to create a degree of resistance to flame but not enough to prevent combustion. So also with inexplodable firedamp, which is methane and oxygen mixed with so much incombustible nitrogen that when it burns it will burn slowly and the burning will not extend far beyond the flame or electric arc which ignited it, and it will cease to burn when the flame is removed. So "explode" is not a synonym for "ignite." An explosion is a self-spreading or self-propagating ignition in an ambient atmosphere in which the combustion can be maintained with more or less intensity until much or all of the explosive gas has been burned.

It must be remembered that where there are open lights protected by gauzes, or not so protected, the methane will burn. Where there are electric arcs in air containing methane, that gas is ignited. This fact adds to the heat of gassy mines. The readiness of the methane to burn is increased when the temperature of the surrounding, or ambient, air is raised, for the igniting flame loses much heat when the air in which it is burning is cool and it retains much of that heat whenever the ambient air is hot, as in an inclosure surrounding an electric switch.

The temperature at which methane begins to burn is 1,202 deg. F. To propagate that flame, the temperature of the methanous air also must be at least 1,202 deg. F. The flame spreads either by reason of the heat of the igniting flame or arc or by reason of the heat generated by the burning methane, or both. Methane fortunately demands of the igniting source a certain temperature for a certain time interval or it will not burn, but give it that ignition temperature, and that time methane will burn no matter how low the percentage of methane in the firedamp. Outside the gauze of a safety lamp, the percentage of gas may be enough for propagation of flame but ignition is prevented because the temperature of the air leaving the lamp is too low to ignite the firedamp, especially as the air passing from an explosion within the gauze inclosure is full of nitrogen and carbon dioxide.

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Colorado Rules for Man-Trip Handling

The following regulations regarding the handling of man trips were issued this year by the Colorado State Coal Mine Inspection Department; Thomas Allen, State inspector.

1. Man trips must be well lighted.
2. Where man trips are loaded or unloaded, no exposed wires shall be permitted, and guards must be provided which extend 6 in. below the trolley wire. Men should leave or enter the trip on the side of the cars away from that wire.
3. Rooms shall be provided for men awaiting transportation.
4. No trips shall be run at high speed in stations where men awaiting man trips are assembled.
5. Machines must not be moved around loading points during the assembly, loading or unloading of men.
6. Loading or unloading of men should be supervised and directed by a competent, reliable man.
7. Men on trips, cages or skips or near loading or unloading points should not be allowed to indulge in horseplay.
8. Number of riders allowed to travel per car in any man trip should be posted at each loading point.
9. No one shall be allowed to get into or out of a man trip until it comes to a complete stop. Before the trip is started all persons thereon should be seated and no one should stand up at any time while the trip is traveling.
10. Engine men and motormen must be thoroughly reliable, have wide experience and be in good physical condition.
11. Where the trolley pole of a locomotive projects over the first car back of the locomotive, no one must be allowed to ride in that car.
12. Where practicable, no one shall be allowed to ride in the last two cars ascending, nor in the first car, descending, a slope.
13. Clearly stated instructions shall be posted at stations, and copies of instructions relative to behavior of men on and around man trips shall be distributed to all employees using man trips.
14. On highly inclined slopes or plane trips, safety chains shall be attached from car to car, or cables shall be strung to connect one end of the trip to the other.
15. All trips descending slopes or inclined planes shall be provided with effective drags.
16. Where man trips descend heavy grades and are hauled by locomotives, track shoes should be provided and used.
17. Men shall not be permitted to travel in cars on gravity planes unless such planes are double-tracked for their entire length and the drums are equipped with a motor or engine such as will completely control their movement.
18. All vehicles shall be carefully handled and shall travel at no greater speed at any time than 600 ft. per minute (6.82 miles per hour).
19. Man trips must never be pushed.
20. A proper signal shall be given between engineer and mine bottom before trip is hoisted.
21. When riding on man trips, goggles must be worn.
22. No blasting caps, powder or loaded shells shall be carried on man trips. Tools shall be carried in a separate car or cars on one end of the trip and shall be so loaded that they will not project over the side of the car.
23. Men shall not be transported in aerial tramways.

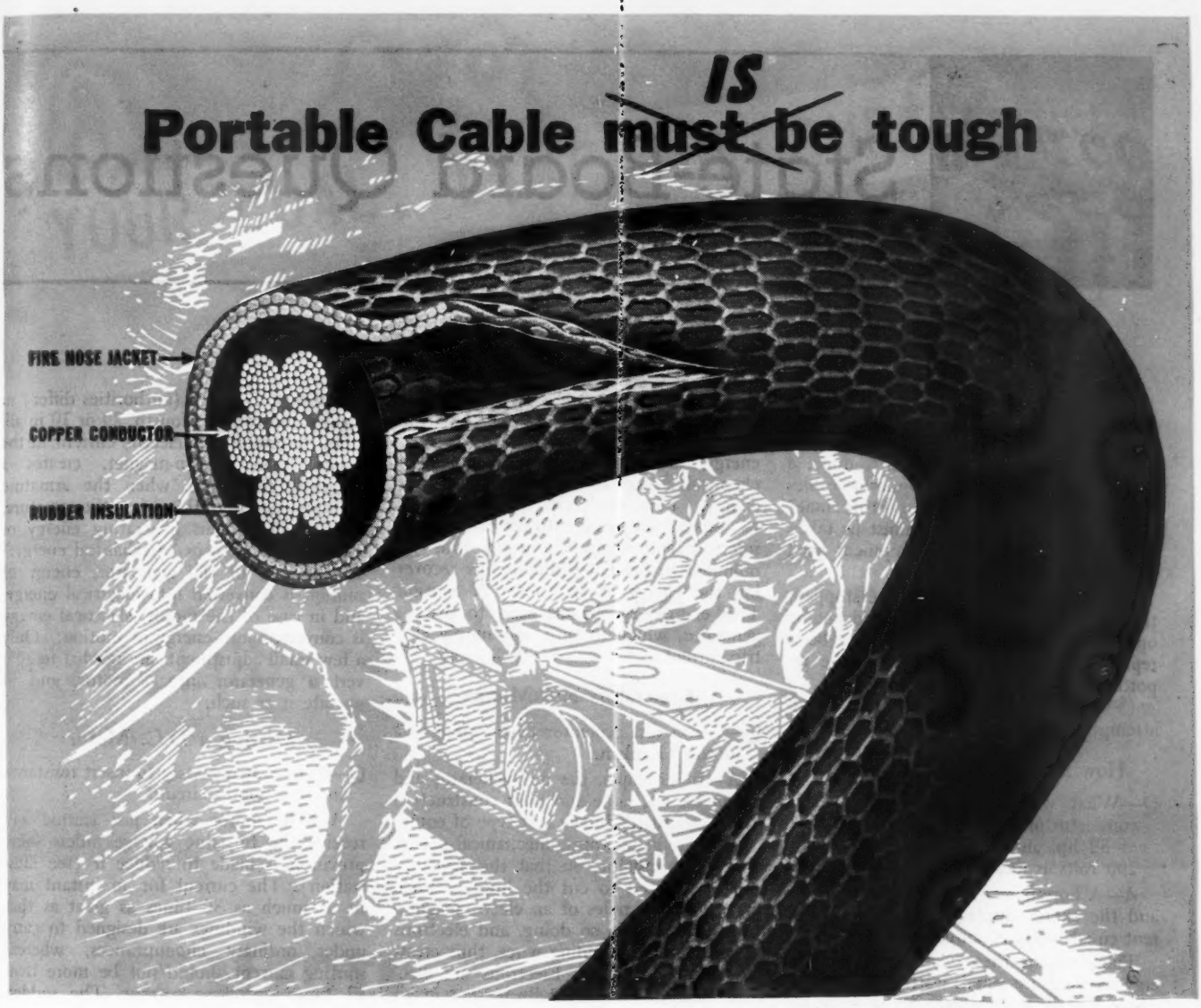
•

Crossbar Better Than 50 Years' Experience

A life is worth a forest of crossbars. Many a man will take a chance to save setting a crossbar that the company for whom he works would willingly supply. He declares experience tells him the roof will stand up. He bids his experience against the safety which a crossbar assures. As the crossbar will cost him nothing and his life everything, he is gambling everything to get nothing.

If you examine the statistics of roof falls you can form an estimate of the number of times such gambling fails, has failed, and will fail. But experience is a good guide nevertheless. Fifty years is a long time, and the man who has had it should have made up his mind unalterably long ago that roofs are treacherous and that a crossbar or strong cap piece is the only way to cope with an uncertain roof. A man can never argue a loose roof into waiting awhile for a car to be loaded or a hole to be tamped.

Portable Cable ~~must~~ IS tough



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State-Board Questions

Bituminous Mine Electricians, Penna.

Q—(a) If, in a gassy part of a mine, a cutting machine, portable motor, cables or rails spark or arc, what must be done?

(b) What precautions must be taken when parts of electrical equipment need repair or adjustment?

A—(a) The machine must be stopped, the defective part disconnected and not be operated again until the defect has been repaired, and the occurrence must be reported to a mine official.

(b) Disconnect from the power before attempting any adjustment.

How Much Current Required?

Q—What will be the current in each conductor of a d.c. motor having a load of 80 hp. and an electrical pressure of 200 volts as measured at the load?

A—A horsepower is equal to 746 watts, and the energy displayed with a d.c. current equals volts × amperes.

Therefore, as these watts and the energy received are equal, watts = 200 × X, where X is the required number of amperes.

$$\text{So, } 200X = 80 \times 746$$

$$X = \frac{59{,}680}{200} = 298.40$$

Therefore, the current needed = 298.4 amp. But this figure takes no account of the fact that the motor will have to receive more energy than it will transmit. Allowing the efficiency of the motor to be 85 percent, the current will have to be, not 298.4 amp., but 298.4 ÷ 0.85 = say 351 amp., for 351 × 0.85 = 298.4; so the correct answer will be 351 amp.

Can Electricity Be Stored?

Q—Can electric power be stored? Explain in detail.

A—Electric power as such cannot be stored, except in a condenser and then only in quantities too small for ordinary power purposes. It can be used, however, to cause chemical reactions between the atoms of certain kinds of matter. When the atoms or molecules of the chemical bodies thus made are in process of being restored to their original combinations, this energy is released and can be utilized. This can be so done that the release will be as electrical energy. The electrical energy fed to a storage battery effects such a reversible chemical change.

When the conditions are reversed, the energy, or work done, in making that chemical change is converted to electrical energy. In a sense, electrical energy can be "stored" by using it to lift water into a reservoir and using the water thus impounded to drive a turbine, thus recovering the energy as an energy of motion. This energy can be arranged to drive a generator, which in turn will supply electric current.

Generators and Motors

Q—Can a d.c. generator be operated as a motor? Explain.

A—In principle, the d.c. generator and motor are the same and their construction is quite similar. In the first type of equipment (d.c. generators), mechanical energy drives the armature so that the armature coils are forced to cut the lines of force radiating from poles of an electro-magnet. Energy is used in so doing, and electrons are freed in the winding wires, thus creating electric current. Electrons are electrical charges fundamentally present in all atoms.

To use a baseball simile, when an electron runs to first base, the electron on first has to leave for second and so on till the electron on the last base makes a run to home plate. But this errs from excessive simplification, for there are almost an infinite number of atoms, and each copper atom has 29 or 30 electrons traveling in four paths, or orbits, and revolving around its single nucleus, two in one path, eight in another, 17 or 18 (authorities differ) in a third and two in a fourth, 29 or 30 in all.

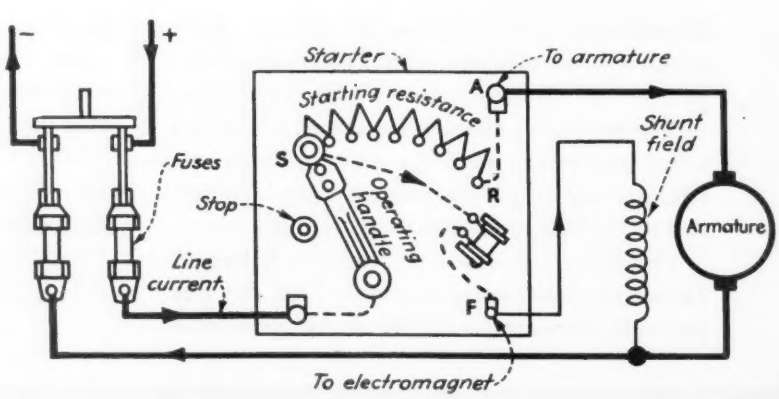
In the motor, the electric current in the "stator," or electro-magnet, creates a magnetic field, and, when the armature coils are energized, this drives the armature, and its shaft, thus generating energy of matter in motion, or "mechanical energy." In the case of the generator, energy of motion is converted into electrical energy, and in case of the motor, electrical energy is converted into energy of motion. Only a few small adjustments are needed to convert a generator into a motor, and to operate it as such.

Starting a D.C. Motor

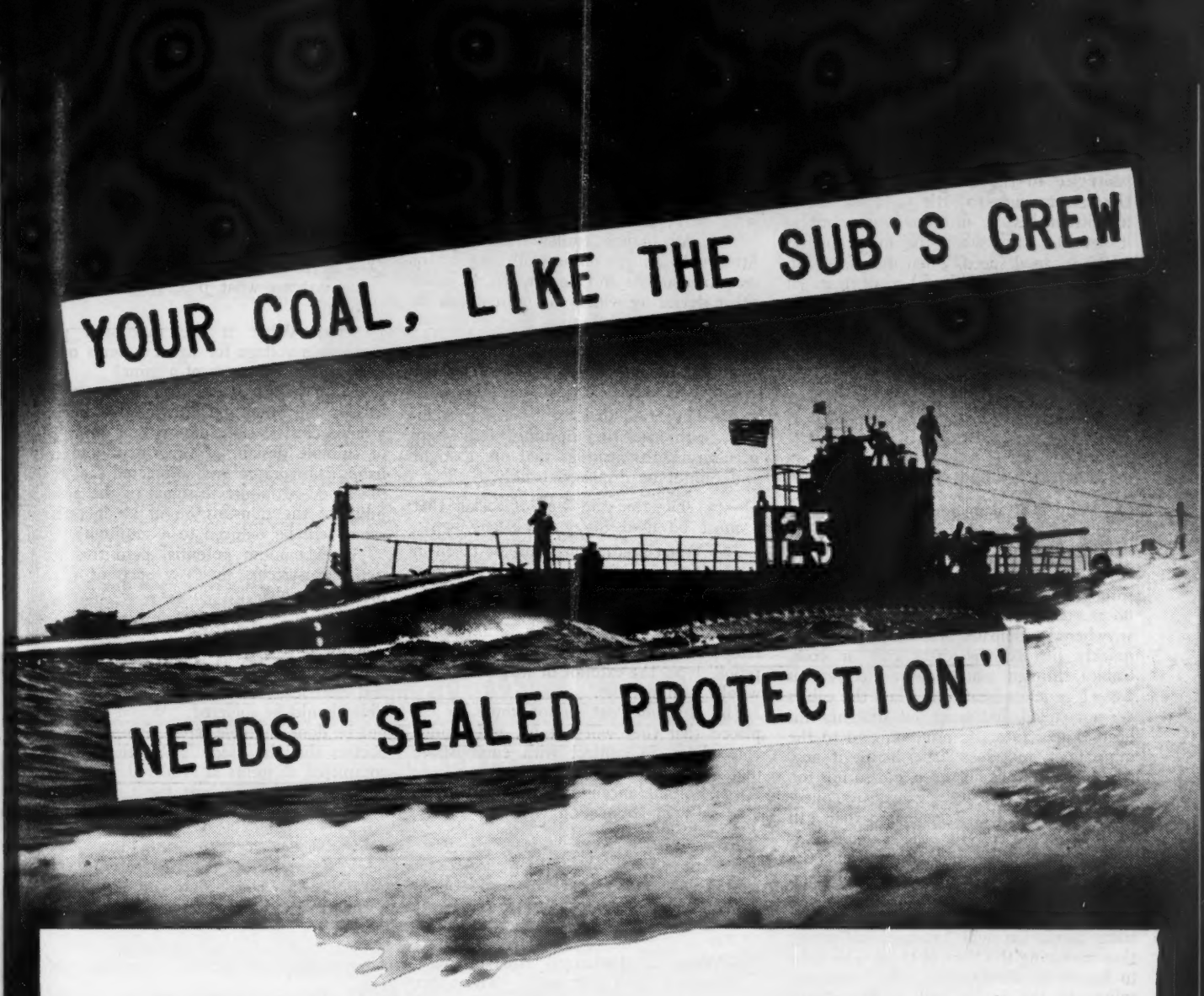
Q—Why is it necessary to insert resistance in a d.c. motor circuit?

A—The motor when just started will receive the full line voltage unless some provision is made to reduce it (see illustration). The current for an instant may be as much as 30 times as great as that which the windings are designed to carry under ordinary circumstances, whereas starting current should not be more than 1½ times operating current. The sudden start resulting from the throwing on of the full line voltage also will strain the motor and connected machinery, for such uncontrolled energy will give the equipment a definite jerk.

The revolving of the armature, however, cuts the lines of magnetic force streaming from the electro-magnet, and in doing so creates a contrary electromotive force or voltage, known as the "counter" or "back" electromotive force, but this



Starting arrangement for d.c. motor. Broken lines show wiring behind starter board. Current goes from line post along the switch handle to starting resistance, through this resistance to *R*, then to *A* and armature. Also from switch handle at *S* direct to field coils (electro-magnet) at *F*. As motor increases speed, switch is thrown from *S* to *R*, bypassing resistance.



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resistance to the receipt of energy from the line amounts to little until the motor has attained some headway, important as it becomes later when the motor arrives at its designed speed. Then it will be cutting a much larger number of lines of magnetic force per second and developing a much greater counter voltage. Until that time the windings may overheat. Hence, it usually is necessary to insert resistance in the circuit so as to cut down the starting current. This resistance is gradually cut out by a controller as the motor approaches its intended speed.

Risky to Coil Live Cable

Q—Why is it dangerous to permit large coils of energized cable to rest on the mine floor?

A—It is dangerous to pass current through coils which are lying on a floor, no matter of what kind, in the mine or anywhere, principally because a fire would quickly involve the extra coil or coils. Cables through which electric current is passing generate heat, but when the cables are not coiled, but lying out straight, this heat escapes into the mine air and to the mine floor and does little harm, if any, where the mine is not deep and so not too warm already. When the cables are coiled, however, more heat is generated than can thus be removed, for the cables heat-insulate each other and also prevent the free circulation of air. Thus, the temperature rises unduly. If this condition lasts, the cable will disintegrate, and its electrical insulation will become ineffective, thus menacing the lives of those who have to handle it. Furthermore, the temporary splices in the cables will readily absorb moisture where they come in contact with the floor. This moisture will cause leakage from the positive to the negative conductor.

Eventually the leakage will carbonize the insulation, which then becomes, not an insulator but quite a fair conductor, as may be realized when you recall that carbon is the material out of which our electric brushes are formed. Once carbonized, the insulation soon becomes incandescent and ignites itself and other nearby insulation. Such an electric flare may result in a disastrous mine fire in which many lives may be lost.

Burning Cable

Q—What would you do if you discovered a large coil of cable had caught fire?

A—Having discovered a large coil of cable on fire, I would (1) have the men working in the immediate vicinity removed from the affected area; (2) disconnect the power immediately at the most convenient point, and (3) notify the mine foreman and proceed at once to fight the fire with sand, rock dust or water, whichever is most convenient and available.

Q—(a) What condition regulates the admission of electric power underground in gassy mines?

(b) What equipment is required at the junction of branch trolley lines?

A—(a) In any gassy mine, or gassy portion of a mine, the electric current transmitted underground by conductors must be located only in passageways ventilated with intake air.

(b) All branch trolley lines shall be fitted with an automatic trolley switch or section insulator and line switch, or some other device by which the current can be diverted from such branch lines.

Q—What provisions must be made where cables or wires pass through metal frames or into boxes or motor frames?

A—The holes shall be bushed substantially with insulating bushings and where necessary with bushings that are gastight and cannot be displaced readily.

Q—(a) Describe the type of socket that must be used for incandescent lights.

(b) What precautions must be taken in placing incandescent lamps? (c) Where may portable incandescent lamps be used in place of battery lamps?

A—(a) The sockets of incandescent lamps must be of the so-called "weatherproof" type, the exterior of which must be wholly non-metallic.

(b) Incandescent lamps must be so placed that they will not be, and cannot come later, in contact with combustible material.

(c) Portable incandescent lamps may be used only in connection with the repairs and inspection of machines and equipment and then only in non-gassy portions of mines. However, battery lamps are not subject to such restrictions.

Q—(a) In installing underground signaling systems what precautions must be taken?

(b) What is the maximum permissible voltage for signal systems operating in gassy parts of a mine?

A—(a) Bells, wires, insulators, contact makers and other apparatus used in underground electric signaling systems must be of suitable design, of substantial and reliable construction and so erected that the likelihood of failure to signal or the possibility of the transmission of an incorrect signal will be reduced to a minimum.

(b) Maximum potential permitted for signaling systems in gassy sections of a mine is 24 volts.

Q—What are the requirements as to the joints in conductors?

A—All such joints must be mechanically and electrically efficient and wherever possible should be soldered. When this cannot be done, suitable screw clamps or connectors shall be used. After the joint is completed all joints in insulated wire must be reinsulated to at least the same extent as the rest of the wire.

Bituminous Mine Foremen, Penna.

Q.—Water is discharged from a mine through a ditch 2 ft. wide. The water is 6 in. deep and is traveling at a speed of 2 ft. per second; how many gallons will be discharged in 24 hours?

A.—Cross-section of ditch $= 2 \times 0.5$ ft. $= 1$ sq.ft.

Volume of water per second $= 1$ sq.ft. $\times$ 2 ft. in a second $= 2$ cu.ft.

Gallons of water per cubic foot $= 7\frac{1}{2}$.

Volume of water per second $= 2 \times 7\frac{1}{2} = 15$ gal.

Volume of water per 24 hours $= 15 \times 60 \times 60 \times 24$ $= 1{,}296{,}000$ gal.

Perhaps, however, you recall that a gallon $= 231$ cu.in., as Congress has ordered, so we might figure in inches rather than in feet:

Cross-section of ditch $=$ 2 ft. $\times$ 6 in. $= 24 \times 6$ sq.in. $= 144$ sq.in.

Volume of water per second $= 144 \times 24 = 3{,}456$ cu.in.

Gallons per cubic inch $= \frac{1}{231}$

Volume of water per second $= 3{,}456 \times \frac{1}{231}$ $= 14.961039$ gal.

Volume of water in 24 hours $= 14.961039 \times 60 \times 60 \times 24$ $= 1{,}292{,}632$ gal.

Q.—What would it cost to dig a ditch 2 ft .wide and 4 ft. deep for a distance of 50 ft. and tapering out in one direction 300 ft. and in the opposite direction 275 ft. if the excavation cost $12 per cubic yard for the completed job?

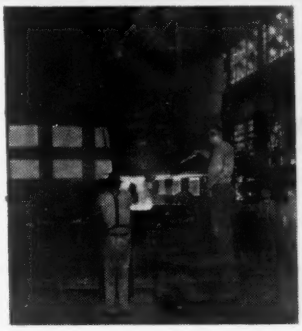
A.—The cross-section of the central portion of the ditch is $2 \times 4 = 8$ sq.ft. and the volume of that portion will be $8 \times 50 = 400$ cu.ft.

The cross-section of the central portion is, as noted, 8 sq.ft. At the end of the taper it is 0 ft. deep but still 2 ft. wide, so the cross-section will be $0 \times 2 = 0$ sq.ft. As only the depth tapers and not the width, the "prismoid formula" need not be used to get an accurate result. This would be necessary only if the width tapered as well as the height, though the prismoid formula will give the same result in this case as does the more simple formula which requires merely a multiplication of the half of the sum of the two end cross-sections of this portion of the ditch with the length of that portion, or $\frac{0+8}{2} \times 300 = 4 \times 300 = 1{,}200$ cu.ft.

Similarly the volume of the opposite end will be $4 \times 275 = 1{,}100$ cu.ft. In consequence, the entire excavation will be $400 + 1{,}200 + 1{,}100 = 2{,}700$ cu.ft. As there are 27 cu.ft. to the cubic yard, the excavation needed will be $\frac{2700}{27}$ cu.yd. $= 100$ cu.yd. At $12.00 per cubic yard the cost will be $1,200, but why should the price be set at $12 per cubic yard? Under favorable conditions a man can dig and load a cubic yard in an hour. These seem to be not unfavorable circumstances and, unless the rock is unusually hard, at least half that quantity could be dug in that length of time.

"ALLCASTEEL" SHEAVES — BULLETIN No. A-396

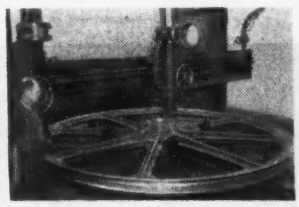
Pouring open hearth steel into the mold for a 12-ft. diam. sheave wheel at the Vulcan foundry. The ladle holds approximately 30,000 lbs. of molten steel when it leaves the furnace so that a number of molds can be poured in quick succession—each mold requiring only a few minutes.



FOR nearly a quarter of a century the Vulcan Iron Works has been manufacturing a different and better type of sheave wheel—cast in one piece from .40 carbon open-hearth steel and carefully heat-treated to secure the best combination of toughness and hardness throughout its entire structure. Long previous experience in the manufacture of old-style "bicycle" sheaves had convinced us that one-piece cast-steel sheaves were the only adequate answer to this important problem and when our present large steel foundry was completed soon after the first world war, we lost no time in beginning their manufacture.

Highly-Developed Foundry Practice Produces Uniformly Perfect Castings

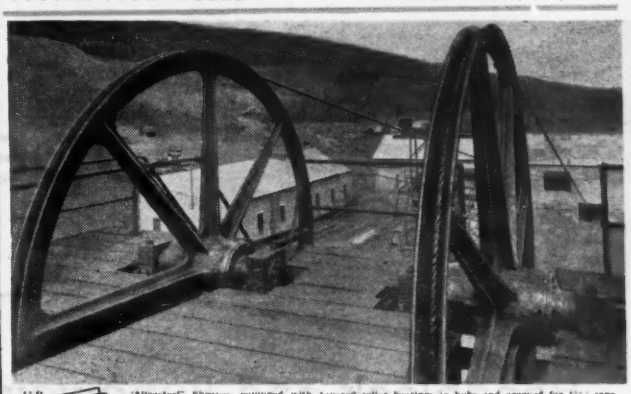
When the manufacture of large-diameter Vulcan "Allcasteel" sheaves was first undertaken the same difficulties were encountered which had discouraged other steel foundries, and which had always been considered inevitable in the casting of large circular objects of any kind having a relatively small cross-sectional area. Eventually, however, a highly specialized method of molding, gating and pouring was developed, which—combined with distinctive method of heat ings which are



"Allcasteel" Sheave on boring mill in Vulcan machine shop.

Page 4

VULCAN IRON WORKS — WILKES-BARRE, PA., U.S.A.



12-ft. "Allcasteel" Sheaves, equipped with tapered roller bearings in hubs and grooved for 1¾" rope.

IMPORTANT OPERATING ADVANTAGES

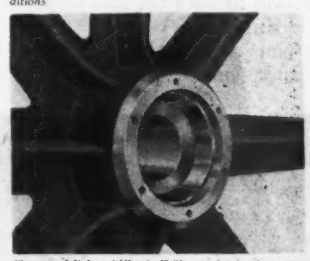
atures to be considered when sheave are safety, effect on power consumption. From Vulcan "Allcasteel" Sheaves d-style bicycle-type sheaves ditional cost can often be ar's operation.

ed not only by the greater ed .40 carbon steel used e-piece construction, but strength is retained in- welded connections, or and eventually cause ignment

on is also assured— ance and permanently more because of their plained on page 10. he rim, reduces the overcome at every and slowing down

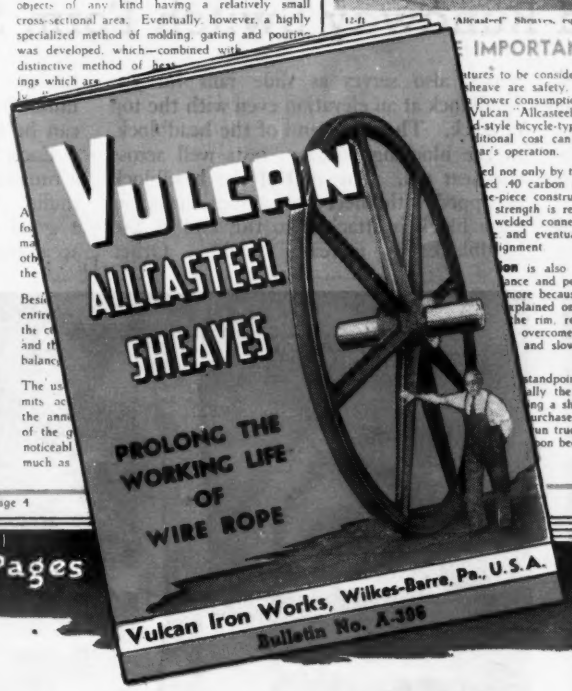
standpoint of oper- ally the most im- ng a sheave. All urchasers against un true or which on become worn

Either of these conditions can ruin an expensive wire rope in a relatively short time and your surest protection is the use of Vulcan "Allcasteel" Sheaves. Rope grooves are always of correct size and shape—alignment and balance are always practically perfect—*and every sheave carries a positive guarantee against any harmful amount of wear in the rope-groove under normal operating conditions.*



Close-up of Vulcan "Allcasteel" Sheave showing how outer races of tapered roller bearings are pressed into hub. Illustration on page 7 shows bearings mounted on shaft.

Page 5



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MODERN MONEY-SAVING SHEAVE WHEELS

It tells why thousands of old "bicycle-type" sheave wheels now in operation have outlived their usefulness—why their defective alignment and worn-out grooves are chewing up expensive rope needlessly—why their excessive weight increases mass inertia, rope friction and power costs.

But there's a brighter side to the picture. It also tells why Vulcan Allcasteel Sheaves are light in weight yet extremely strong and tough—why their original perfect balance and accurate alignment never change—why their smooth hard groove-surface resists wear; thereby prolonging the useful life of wire rope—reducing lubrication and power costs—promoting safe operation.

This sheave-wheel bulletin is different from any that you ever saw before—packed full of engineering data and other useful information relating to the selection and operation of sheaves and wire rope, yet interesting and easy to read throughout. Write for Bulletin No. A-396 today. No charge or obligation.

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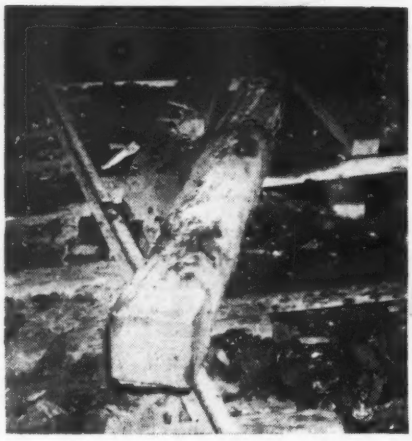
Operating Ideas

Headblock and Runaway Switch Form Safety Team

HEADBLOCKS and runaway switches are always set to block or derail cars at the various collieries of The Hudson Coal Co., Scranton, Pa. This order, which is protection to both life and property, is known as "Rule 44."

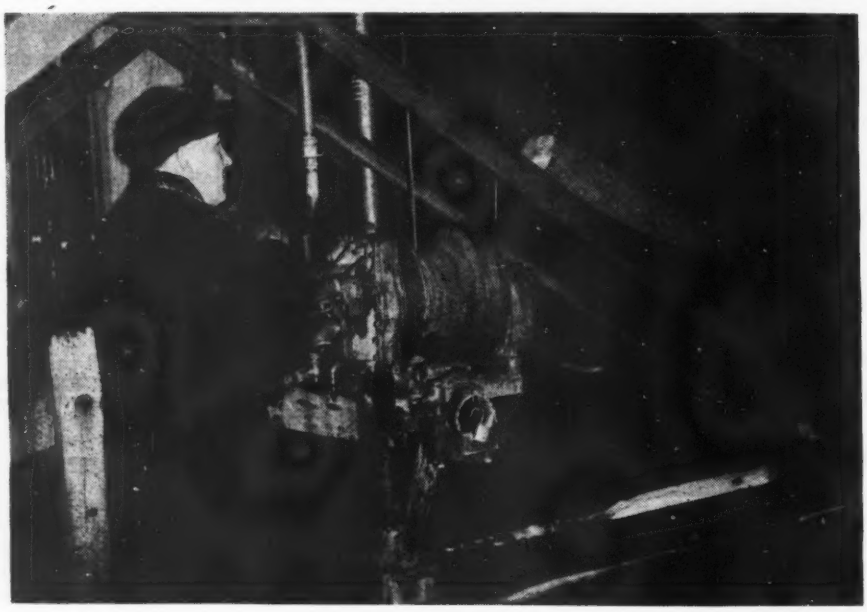
One end of the headblock butts solid against one corner of the framework, which also serves as slide rails for the headblock at an elevation even with the top of track. The other end of the headblock, in the blocking position, rests well across the near rail. This end of the headblock is capped with sheet iron. Sometimes, an extra block is attached to this end of the headblock to increase height. Other timbers are nailed to the framework to limit the range over which the headblock can be shifted.

Each headblock station is backed up by a runaway switch, normally set against the traffic. Together, these two devices form a good team for fighting mine haulage accidents.



A headblock and runaway switch installation set against traffic at Loree colliery's No. 4 shaft.

Air Hoist Helps Cage Rails and Timbers



AN AIR-OPERATED TUGGER HOIST saves manpower and makes the job of caging rails and timbers easier at Grassy Island No. 4 colliery, says Gus Ollendike, maintenance foreman for Olyphant and Eddy Creek collieries, The Hudson Coal Co., Olyphant, Pa.

Timbers and rails, formerly handled by hand, now are raised and placed on the cage with the help of a Type 10 H nonreversible Ingersoll-Rand air tugger. The hoist has a capacity of 1,500 lb. and is equipped with a brake for lowering.

Before the air hoist was installed it took four men to handle timbers and six men to handle rails—now, only two men are required for either task.

In summing up the benefits of this installation, Mr. Ollendike remarked: "Now it takes fewer men, less time and less work to handle the same amount of supplies."

One man operates the air hoist and another attaches the tongs to the timber.

A B
C D
E F G
H I J K
L M N O
P Q R S
T U V W
X Y Z

1 2 3 4
5 6 7 8
9 0

2 + 2 = 4

2 x 2 = 4

4 - 2 = 2

4 ÷ 2 = 2

¼ + ¼ = ½

½ x ½ = 1

½ - ¼ = ¼

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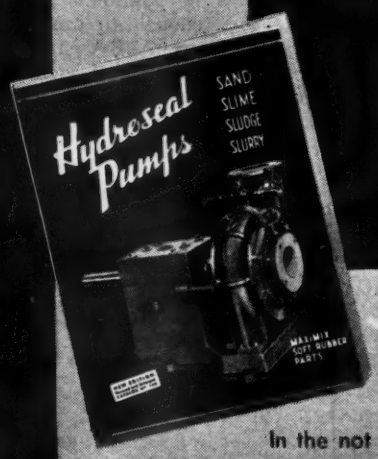


Does Job with ⅓ Less Power

In the not too distant (we hope) future, when you can buy what you want, when you want it and get it promptly, you will better understand why in these war years, Hydroseals have been sold only on the highest priorities. Hydrosealing saves ⅓ to ½ in power or with the same power you are now using on a job, it will pump more material. Further, Maximix Replaceable Pumping Parts (Yellow in diagram above) far outlast metal on most jobs. The combination of Hydrosealing (arrows in diagram) and Maximix saves money in power and maintenance. Catalog No. 140 explains the details. Write for it today and use it in your Post-War Plans.

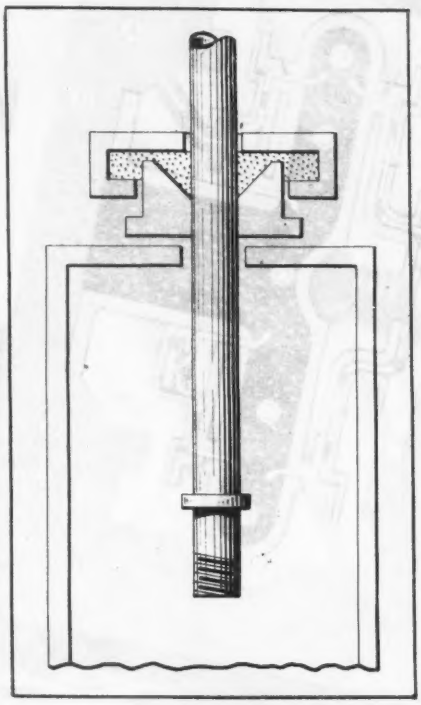
THE ALLEN-SHERMAN-HOFF CO., 231 S. 15th Street, Philadelphia 2, Pa.

Offices or Representatives in most Principal Cities

Restoring Pump Rods Cuts Maintenance

"STEAM-PUMP RODS are expensive these days and the metal for replacements can be put to many essential war uses if we can manage to lengthen the life of the old rods at a reasonable cost," declares P. C. Ziemke, Oak Ridge, Tenn. "The procedure is simplicity itself the way we do it. We turn the rod down in the lathe until the taper has been fully removed and the diameter has been decreased approximately ¼ in. The next step is to reduce the inside diameter of the stuffing box by inserting a ring of babbitt. Finally, a split bronze washer is fastened in the end of the stuffing box with flat-headed bolts so that the packing will remain fixed and not work out of place.

"For all practical purposes, the old rod functions with the same efficiency as a new one fresh from stock and will last fully as long."



Showing pump - rod installation after turning down and installation of auxiliary stuffing-box items.

Always Popular

Month after month a poll of Coal Age subscribers rates this section near the top of the list. Its popularity could be due to the fact that Operating Ideas can be quickly digested. We feel it is popular because all the operating ideas are useful—are ideas in motion—ideas paying off. You can help us maintain this popularity rating by sending in a new electrical, mechanical, operating or safety idea which you have at work. A sketch or photograph should be included if it will help make the idea clearer. For each acceptable idea Coal Age will pay $5 or more on publication.

Feeder Belts Can't Overload Main Belt

ELECTRICAL SWITCHES located at the discharge ends of the feeder belts prevent the main belt from being overloaded by receiving coal from too many feeders at one time, writes James Hale, mechanic, Hecla mine, West Kentucky Coal Co., Earlington, Ky.

An electrical switch, actuated by the mechanical device shown in the accompanying illustration, provides the interlocking to limit the number of feeders discharging onto the main belt at any one instant. While the feeder belt is carrying coal the sag of the belt, due to the coal load, causes the belt to bear more heavily on the skate wheel device and forces it to shift its position. This change of position is enough to cause the switch contacts to open. By wiring the switches according to the sketch the second feeder belt can be kept from dumping coal onto the main belt while the first feeder belt is discharging coal.

Sets of this device in use on two feeder belts, according to Mr. Hale, are working fine and taking the place of a man at each of the two belt drives.

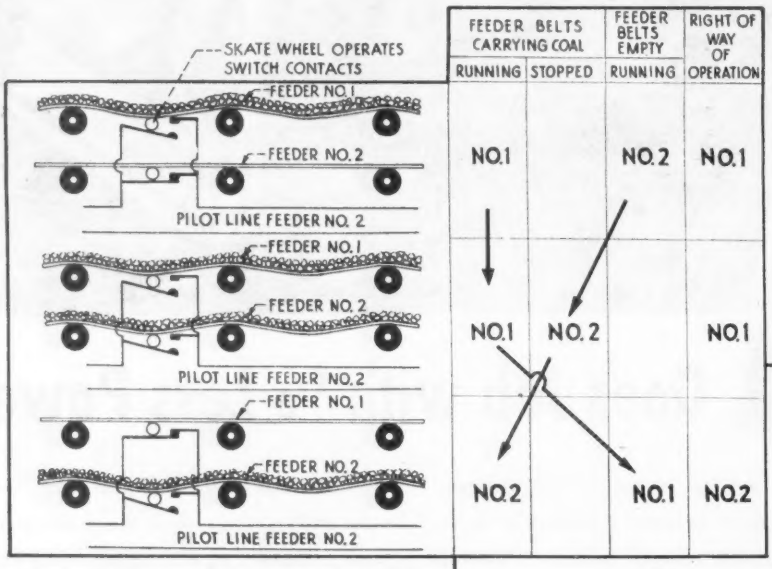


Fig. 1—No. 1 and No. 2 feeder belts are electrically interlocked to prevent overloading belt collecting from them.

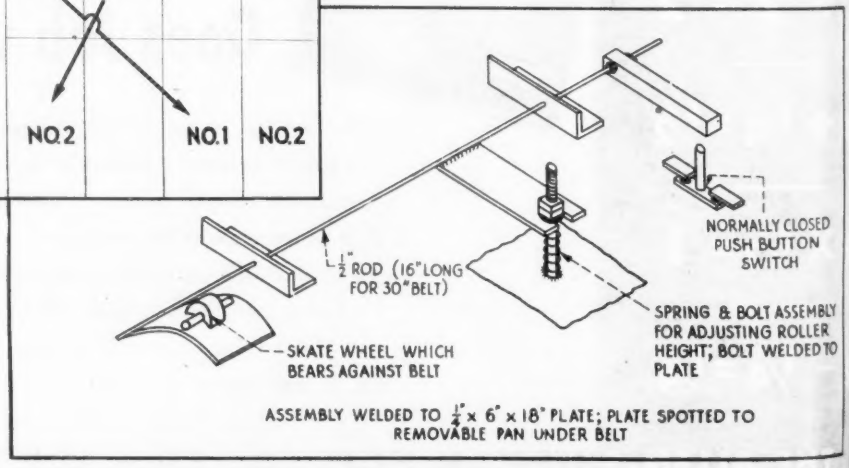
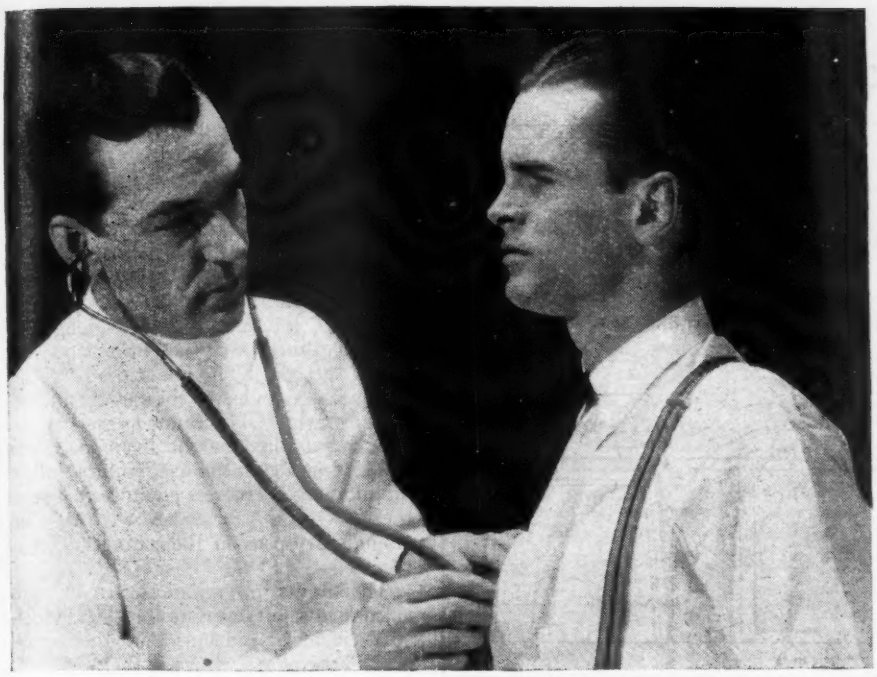

NORMALLY CLOSED PUSH BUTTON SWITCH
½" ROD (16" LONG FOR 30" BELT)
SPRING & BOLT ASSEMBLY FOR ADJUSTING ROLLER HEIGHT; BOLT WELDED TO PLATE
SKATE WHEEL WHICH BEARS AGAINST BELT
ASSEMBLY WELDED TO ¼" x 6" x 18" PLATE; PLATE SPOTTED TO REMOVABLE PAN UNDER BELT

Fig. 2—How interlocking mechanism is assembled.



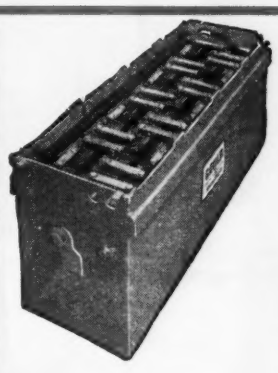
DIAGNOSIS

Battery ailments, like those of the human system, must be diagnosed by an expert.

Proper diagnosis of your battery requirements is the first step in obtaining efficient, economical battery service. Gould field engineers are technical experts. They can give you authoritative decisions on what type and size of battery is best for your particular job.

Behind these men is the Gould organization with half a century of battery research and experience. Originator of such outstanding batteries as the Gould Kathanode and the Gould Plante, the engineering department can be depended on to translate the field engineer's findings into the proper installation.

Here is a specialized service at your command. We invite you to use it.



GLASSKLAD *since 1925*

Write Dept. 94 for Catalog 300 on Gould Kathanode Glassklad Batteries for Mine Shuttle Car Service.

GOULD

Since 1898 . . . THE BATTERY PICKED BY ENGINEERS

THE UNIQUE GOULD KATHANODE

One of a series of informative articles for users of industrial batteries

Gould Kathanode battery construction was originated in the United States 20 years ago. Basically it meant the use of a glass retainer against the positive plate surfaces, but Gould has developed it far beyond the original conception.

In the Gould Kathanode construction of today you get the famous long life Black Oxide active material, a grid designed to match active material life, and specially made spun glass mats which lock active material in place and protect this vital unit against service abuse.

The "Unit-Seal" envelop, a perforated rubber sheet, 60% porous, is then wrapped around the plate and mats—forming the now famous Gould Kathanode Positive Unit.

These features are important because in addition to being an efficient supplier of electrical power, a storage battery must be able to withstand whatever rough handling its service demands.

Gould design and construction, however, do not stop with perfecting the positive unit, for Gould engineers know that unless all parts meet service requirements, the failure of any one may make the entire battery inoperative.

Important in this overall design is the negative plate. Gould uses an interlocking bar type grid. The negative active material is a highly porous, metallic oxide compounded to a special formula that assures close electrical contact with grid members.

Separation is effected by means of another Gould development, Durapor rubber separators. These have great porosity, deep channels, and thin backweb, without any sacrifice in strength or durability.

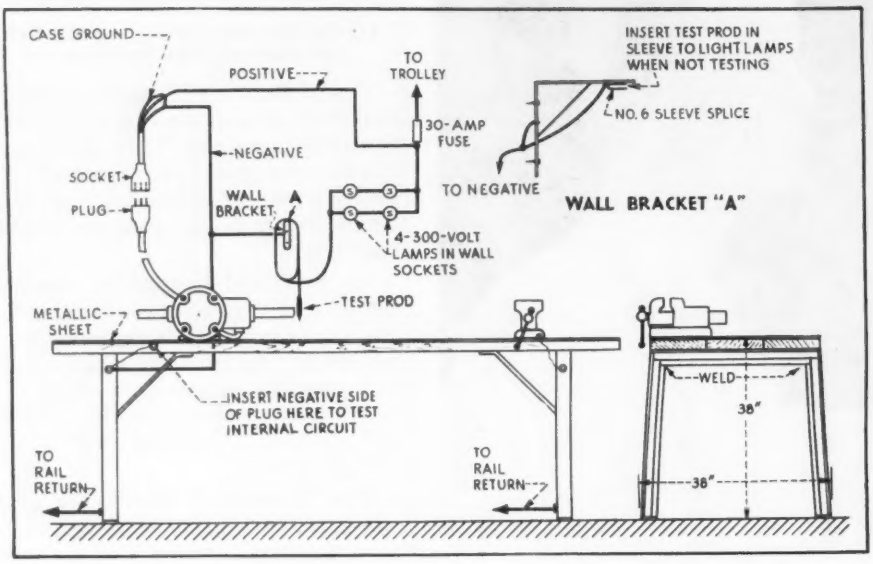
The element is then placed in a hard rubber or monobloc container. The cover, also of hard rubber, fits over this assembly and is sealed with a compound that resists vibration or cracking. A tight terminal post seal is made by using a soft spool type bushing. compressed between the cover and sealing mat.

This completeness of design, developed over 20 years of service with the Kathanode principle, has resulted in a better product, better for the user from all standpoints.

For Excellence in storage battery production at Depew plant

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y., Factories: Atlanta • Chicago • Dallas • Depew • Leavenworth Los Angeles • North Bergen • Rock Island • St. Paul • Sioux City • Zanesville

Special Equipment Speeds Drill Repairs



How test equipment is placed as an aid to making quick repairs to drills.

A SHOP-MADE test bench, writes E. C. Hitchcock, night electrician, The New River Co., Mine No. 6, Summerlee, W. Va., facilitates the repairing of coal drills in the underground shop.

The bench, shown in the accompanying illustration, is supported on legs made from 30-lb. rails and has a 36-in.-wide top made with three 2x12-in. boards 10 ft. long, with a metallic sheet over the entire top. The top of the bench, the vise and all legs and braces are grounded to the rail circuit.

Drills which break down on the day shift are repaired by the night electrician and sent inside on the man trip the following morning. The test equipment permits the electrician to locate quickly any grounds or opens in the wiring circuit of the drill.

The drill-case grounding circuit, provided as a safety measure, says Mr. Hitchcock, is always included in the testing procedure.

Dummy-Making Time Shortened

ROLLING the dummy paper on a short piece of pipe and racking the paper cartridges in a box before they are filled with a shovel have reduced the cost of dummy making, declares Tom Peyton, mine foreman, North Diamond No. 2 mine, West Kentucky Coal Co., Earlington, Ky.

A galvanized pipe of the proper size is used as a form for rolling the dummies. Both ends of the pipe should be beveled so that the closed end of the paper cartridge will not be cut as it is tapped on the wooden box (shown in the accompanying illustration) to crimp it before it is slipped off the pipe. Cupping the paper in at the bottom serves to reinforce it, a feature which is important when the loaded dummy is finally picked up.

The paper cartridges, as they are finished, are stacked in empty powder cartons. Afterward, one man with a shovel fills the cartridges, one carton at a time. When they are half full, he jolts the carton on the ground two or three times, and then finishes the filling operation. This is decidedly quicker than the old method of filling each paper cartridge individually.

This "wholesale" method of filling dummies, states Mr. Peyton, provides good dummies at a lower cost.

After the dummies are formed they are packed in pasteboard cartons and then filled by shovel.

Serial Number Sticks With Car

BRANDING each pit car with a serial number that will last aids materially in taking car inventories as well as keeping a record of the repair expense on individual cars, declares J. M. Reid, former superintendent, Olyphant and Eddy Creek collieries, and now general superintendent of mines, The Hudson Coal Co., Olyphant, Pa.

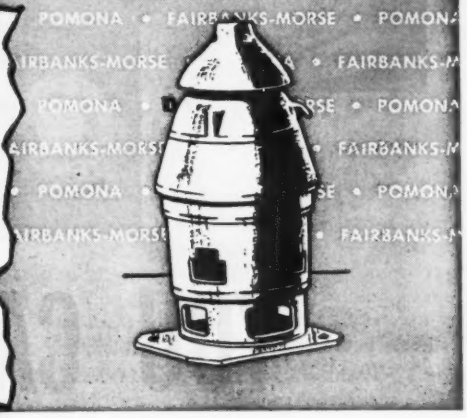
Each wooden car has a number burned deep into the topmost board on each side. Each numeral is made by a metallic branding iron 3 in. wide and 4½ in. high which has been heated red hot.

The position of the number and the clear-cut figures of which it is composed lends much to the keeping of accurate records of some 5,800 pit cars at the Olyphant and Eddy Creek collieries.

Each pit car bears a serial number on the topmost board of each side.

Q: FROM WHICH COMPANY CAN YOU OBTAIN *any type* OF TURBINE PUMP YOUR JOB REQUIRES?

A: Many important advantages are now offered to users of vertical turbine pumps by Fairbanks, Morse & Co. For this organization not only supplies the regular line of Fairbanks-Morse Turbine Pumps, but also the Fairbanks-Morse *Pomona* Turbine Pumps. This combination of the Fairbanks-Morse and Pomona engineering organizations places at your service the most highly skilled group of engineers in the industry. Moreover, it enables these engineers to supply you with the exact type of pump best suited to *your particular* requirements, regardless of your water-moving job!



Does your job call for *water* lubrication . . . or *oil* lubrication? When you call in a Fairbanks-Morse engineer it makes no difference which you require, for these men are not limited in their choice of pump designs. If your job calls for *oil* lubrication, they will recommend the Fairbanks-Morse Oil Lubricated Turbine Pump. If *water* lubrication, the Pomona Water-Lubricated Pump will be their recommendation. Either way, you get a completely unbiased recommendation on the type of pump best suited to *your* particular application!

Should you have *open* impellers . . . or *closed* impellers? Here again—*whatever your need*—Fairbanks-Morse and Pomona engineers are free to recommend the design giving best performance on *your* job. Some applications may call for Pomona's semi-open impellers because of their ability to handle pulpy or grit-laden waters and their ready adaptability to varying flow requirements with proportionate savings in power. In other cases, closed impellers may be more efficient. In either case, Fairbanks-Morse engineers are able to give you the pump YOU need!

GET THE MOST FOR YOUR PUMP DOLLAR by bringing your problem to Fairbanks-Morse. Our trained engineers will gladly make recommendations and work with you on the most efficient and economical solution of your particular water-moving problem. A letter, wire or phone call places this fund of pump "know how" at your service. Fairbanks, Morse & Co., Chicago 5, Ill.

Write for Bulletin H-45.

For smaller-gallonage applications ask about Fairbanks-Morse WESTCO Pumps . . . the horizontal turbine pumps that are simple to maintain, long wearing and unusually adaptable to varying types of work.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales
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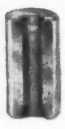
YOU CAN'T LOSE...

Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector.

Easily removed heat treated Rivet holds Bearing Pin against longitudinal displacement.



Hardened Eccentric Pin is designed so it can't turn in block . . . puts joint wear between pin and insert.

INVEST WISELY IN CINCINNATI CHAINS, BITS *and* CUTTER BARS

CINCINNATI CHAINS AND BITS are a sure thing. The Cincinnati Mine Machinery Company with its staff of practical engineers has devoted over 20 years to developing and improving mechanized coal cutting equipment. During that period Cincinnati sturdy, long life Chains and double ended reversible Bits have earned an enviable reputation for top performance . . . for lowering coal cutting cost and for increasing production. No job is too tough for this well engineered, heat treated equipment . . . invest wisely . . . in Cincinnati Chains, Bits and Cutter Bars. For Time Tested Efficiency, it's "CINCINNATI MINE."

THE CINCINNATI MINE MACHINERY CO.

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News Round-Up

Bituminous Pact Extended 30 Days; WLB Takes Jurisdiction in Case

ALTHOUGH the bituminous wage contract expired at midnight March 31 without agreement on a new pact, a nationwide strike was averted when John L. Lewis, United Mine Workers president, agreed April 1 to work 30 days more while contract negotiations continued, with the understanding that any increases in wage rates or other consideration would be computed retroactively from April 1. Previously the miners had voted March 28 in favor of a strike by 208,797 to 25,158.

Both the operators and the miners had accepted the night before an order by WLB that operation continue, but a demand by Mr. Lewis that the operators pay $15,000,000 into a fund to be held in escrow, or file a surety bond in that amount, to guarantee payment of any back wages that might be due the miners when the dispute was settled caused the producers to balk. This was followed by a long debate, but when the negotiators met next day he did not insist on the bond.

Final stages in the March negotiations followed a familiar pattern. On March 26, Secretary Ickes addressed a letter to the conference calling on "both the mine workers and the operators to continue the uninterrupted production of coal under the terms and conditions of existing contracts, at least until May 1, with the understanding that if any wage adjustments which are approvable under the current wage policy should become effective, such adjustments shall be computed and applied retroactively from April 1, 1945."

With the miners electing to reply separately, the operators on March 27 summarized briefly their counterproposals, pointed to the dangers of assuming an unknown obligation under the retroactive principle and proposed that present agreements be extended one month with payments of amounts already offered the miners March 16, "with the understanding that there would be no retroactive liability at such mines for work during this period." Placing the cost of the March 16 offer at 10½c. per ton (51c. per man per day), the operators wrote that "it is assumed that the Secretary of the Interior will undertake to immediately secure an increase in prices sufficient to cover the increase proposed herein."

Secretary of Labor Perkins met with both sides on March 27. Meantime, it was reported that the operators had raised their concessions to approximately $1 per day, but found the miners still adamant. A compromise proposal by the Labor Secretary March 29 was said to include:

A basic seven-hour day with time and a half for overtime; all time underground to be computed as work time.

A flat vacation payment of $75 a year.

Premium pay of 4c. an hour, second shift; 7 or 8c. an hour for the third shift.

Free detonators and caps, but not free explosives.

Increases in the rates for crewmen below the loader or conveyor operators' rates in mechanical mining to within $1 a day of those rates.

Her proposal also contained a compromise of the U.M.W. demands for inclusion of the supervisory force in the union. Assistant foremen and those above that rank, she proposed, would be excluded. Sympathy strikes would not be permitted.

Lewis agreed but the operators rejected the proposal, primarily because of its cost. The Secretary proposed an extension of the old contract in the same terms as suggested by Mr. Ickes (rejected) and then recommended that the whole matter be left to arbitration, which also was rejected by the operators.

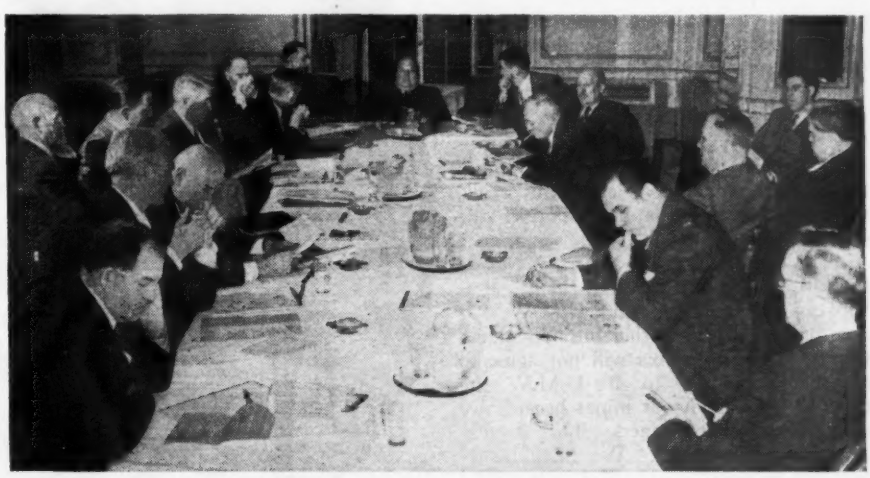
Meantime, it was announced that members of the Coal Producers' Association of Illinois and the Progressive Mine Workers of America had agreed March 23 to extend the present contract to May 1 with all concessions that might be made, approved by federal authorities and ratified by both parties retroactive to April 1.

Evidence of serious division between miners and operators appeared March 16, when the operators' committee presented its reply to the demands of the miners. Rejection of the miners was prompt and unequivocal, but their reply expressed hope of agreement.

Flatly rejecting the union's demand for a royalty of 10c. a ton, to be used for an insurance and hospitalization fund under the union's jurisdiction, the operators' committee said it "believes it is not vested with authority to make a commitment for the industry of this character and that this matter does not go to the question of wages, hours or working conditions; that the plan constitutes double taxation on the industry for social welfare, for which it is now paying approximately 10c. per ton, as follows:

Social Security	$0.0174
Unemployment Tax	.0351
Compensation Insurance	.0468
Vocational Disease Insurance	.0004
	$0.0997

which in 1944 amounted to more than $61,000,000. This amount was contributed solely by the operators; it is a matter of public concern and is therefore a problem that should be considered not by this



Bituminous operators and United Mine Workers confer on possible new contract. Left to right: operators—Harvey Cartwright, Hubert Howard, George Campbell, Eugene McAuliffe, Kenneth Spencer, Charles O'Neill, George Thursby, Edward R. Burke, Joseph J. Ardigo, Ezra Van Horn (chairman); U.M.W.—Edward Lynch, John Owens, Thomas Kennedy, Charles Hicks, John L. Lewis, John O'Leary, Hugh White and Samuel Caddy.

wage conference but by public legislative bodies and then only after a complete and thorough investigation by such legislative bodies of all the problems involved.

"This proposal presents to the conference," the operators' representatives contended, "a new social theory and philosophy, the effect of which would extend to every industry in America, and as such must be considered and acted upon as a national problem and not as one relating to the coal industry alone, and in the judgment of the committee, we repeat, is one to be considered by public legislative bodies. Without consideration of the cost to the industry and indirectly to the public, it proposes the imposition of what in effect is a large tax upon the industry and the public by a private enterprise, the United Mine Workers of America. It encroaches directly upon the function of government by usurping the taxing powers and the problems of social welfare and would result in increased cost of coal and lessen the tax income of government."

Other money demands rejected were: free explosives and accessories, adjustment of differentials within and between districts, upgrading of all men on mobile units to the highest grade in the group, free hats, goggles, shoes and boots, payment for impurities in coal, tracklaying and six holidays a year. Maintaining that the majority of mines cannot be managed by one superintendent and one mine foreman, the operators opposed the proposal to include supervisors other than these under coverage of the agreement.

Instead of premium pay of 10c. an hour for the second shift and 15c. for the third shift, as the union demanded, the operators offered 4c. and 6c. for productive work only. No differential would be paid to employees on continuous-duty operations.

In place of the miners' demand for an increase in the annual vacation payment from $50 to $100, the operators offered a plan based on length of service. An employee with one year of service would get a vacation payment equal to 2 percent of his straight-time earnings for the preceding year. Employees with service of five years or more would get 4 percent.

The operators' offer would assume travel time from portal to portal to be an hour a day and would pay for it at the regular rate; lunch period not to be paid for.

Considering the U.M.W. demand that they might conduct a sympathy strike without violation of a new contract the operators said:

"The contract with U.M.W. was made to work mines, not to strike them. It is between the operators and U.M.W. It does not involve any other business or enterprise. The operators will not agree to any such proposal as to give U.M.W. the right to shut down our mines because we ship coal to our customers. That is what we are in business for. We therefore reject this proposal."

Taking a dubious view as to progress toward an agreement, Charles O'Neill, operators' spokesman, summarized the operators' position at a press conference March 20. He said, in part:

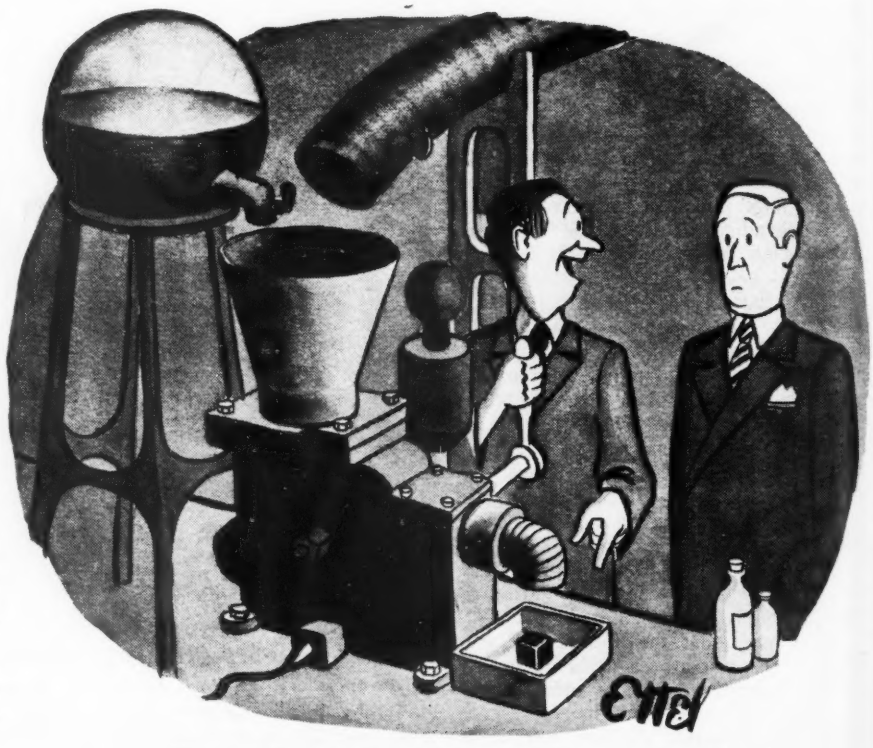
"In response to the miners' demands we submitted a proposal granting concessions and money to the union. These proposals covered the establishment of a vacation period and payment of $50 for men with one year's service and approximately $100 for men with five years' service or more. In line with directives issued by WLB in other industries and particularly in a recent decision in the steel industry, we agreed to establish shift differentials on the same basis as was established in that decision—4c. an hour for second-shift and 6c. an hour for third-shift workers. We agreed to modify the amount paid for travel time on the basis of the present 8¾ hours from two-thirds time rate established by WLB to the regular rate of $1 per hour on the $7 man, raising the wages for the inside day men from the present $8.50 to $8.75 per day.

"The wage increases offered by the operators, as we calculate them, amount to 36.6c. per day, on the average, or $2.196 per week. On vacations, by granting the demand of an additional $50 for five-year men or more, the increase amounts to 9.4c. per day, or 56c. a week. On shift differentials, based upon 7¾ hours of productive time, there is an increase over all of 10.8c. per day, or 65c. a week. These make a total daily increase of 56.8c. per day, or $3.41 a week, on top of what we are now paying.

"We have been considering these proposals of U.M.W.—there are some 18 in number. Some of them are repetitious, some of them complex, and some of them call for direct wage increases. We recognize that in a brief interview it is impossible to go into detail on every one of these demands, but I call attention to No. 12 (a) and (b). 12 (a) reads: 'Mobile operators' rate shall apply to all men in the unit.' Those units comprise classifications of 13 to 15 different men. Their demand is that they get the highest rate for all of the men. It would destroy every classification in our agreement who are employed on mobile loading units, including tracklayers, locomotive runners, timbermen, shotfirers and all of the other men who are engaged in those classifications. The requested wage increases would run from $2 a day down to approximately 44c. per day. I imagine the average increase on the crew under the three high-priced men would amount to about $1.75 per day, on the average. In addition to this, this proposal would result in a demand for a similar increase to the operator's rate of all of the men engaged in similar classifications employed in the mine, or, in other words, it would have a tendency and we believe would result in the establishment of one rate to all men underground, and that would be the highest rate. Roughly one-half of the men work on a day wage basis.

"There are a number of other demands of the same kind. Demand No. 17 is divided into five or six parts, most of them concerning technical operating conditions. 17 (a) reads: 'Operators shall be required to pay for all slate, rock or impurities,' which would mean the disturbance of and the changing of all of the yardage and deadwork scales in the country, as we understand it.

"Many of the other demands are of a similar character, but we have gone over them, we have considered them, we have called the attention of the mine workers to their implications as we see them, and up to date we have received no response that would indicate any approaching solution of the problems we have to settle here, so within ten days of the expiration of the contract the operators' committee elects



"Seven gallons of oil, a twist of the wrist . . . and coal!"

Looks like wheat, but they tell me it's Rubber!

IT *IS* WHEAT . . . but in 1944, nearly 150 million bushels of wheat produced the alcohol used in making 400,000 tons of synthetic rubber.

But this is just *one* of the interesting facts about synthetic rubber. Another is the well-defined superiority that some synthetic rubber has over natural rubber for many uses.

Hewitt has had long experience with synthetic rubber. In fact, *14 years ago,* Hewitt engineers developed the first synthetic rubber gasoline hose. It lasted *ten times longer* than natural rubber gasoline hose.

Hewitt progress in the development of synthetic rubber products has never ceased. And today Hewitt is convinced that certain synthetics are *here to stay* . . . no matter when or how much natural rubber is available.

So, for today's belt and hose requirements, buy with confidence and satisfaction from men who know "synthetics."

Specify "Hewitt" for synthetic rubber quality at its best. Phone the Hewitt distributor listed in the Classified Section of your telephone directory . . . or write Hewitt Rubber Corporation, 240 Kensington Avenue, Buffalo 5, New York.

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Job-Engineered Industrial Hose • Belts • Molded Goods

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to say unanimously that it does not believe any progress has been made toward a settlement of a wage scale for the ensuing period."

Mr. O'Neill replied to the union's demands March 2, warning that "it is impossible to consider a shutdown of the bituminous coal mines of the United States. It is obvious to laymen that there must not be a stoppage of the production of coal if we are to supply our armed forces with guns, ammunition, planes and ships." He denied that the operators had any knowledge of "a conspiracy to prevent an agreement, bring about seizures and a general chaotic condition in the industry," as charged by Mr. Lewis.

Members of the negotiating subcommittee include:

Officers of the conference—Ezra Van Horn, chairman; Thomas Kennedy, secretary; John T. Jones, secretary pro tem; Joseph J. Ardigo, assistant secretary.

Representing the Operators—Charles O'Neill, North; George F. Campbell, Middle West; K. A. Spencer, West; E. R. Burke, South; Harry M. Moses, captive; Hubert E. Howard, stripping, Illinois and Indiana; alternates, Harvey Cartwright, Middle West; Engene McAuliffe, West.

Representing the Mine Workers—John L. Lewis; John O'Leary, vice president, U.M.W.; James Mark, Pennsylvania; George J. Titler, West Virginia; Hugh White, Illinois; Frank Hefferly, Colorado; alternates, William Mitch, Alabama; Sam Caddy, Kentucky.

Mr. Van Horn named a three-man committee to draft a formal reply to Mr. Lewis' royalties demand. Those appointed were Harry E. Moses, Hubert Howard and Edward R. Burke.

President Roosevelt appointed William H. Davis, chairman of the War Labor Board, to be Director of Economic Stabilization March 7, succeeding Fred M. Vinson, the new Federal Loan Administrator, and named Dr. George W. Taylor, WLB vice chairman, as Mr. Davis' successor. Prior to stepping out, Mr. Vinson relaxed his position in four types of fringe wage issues—shift differentials, vocations, merit increases and reclassifications—but fixed standards for the board to follow. His directive ordered other fringe issues held to the OPA principle that if wage adjustments would affect price ceilings they could not become effective. The directive provoked a storm of unfavorable criticism from labor leaders.

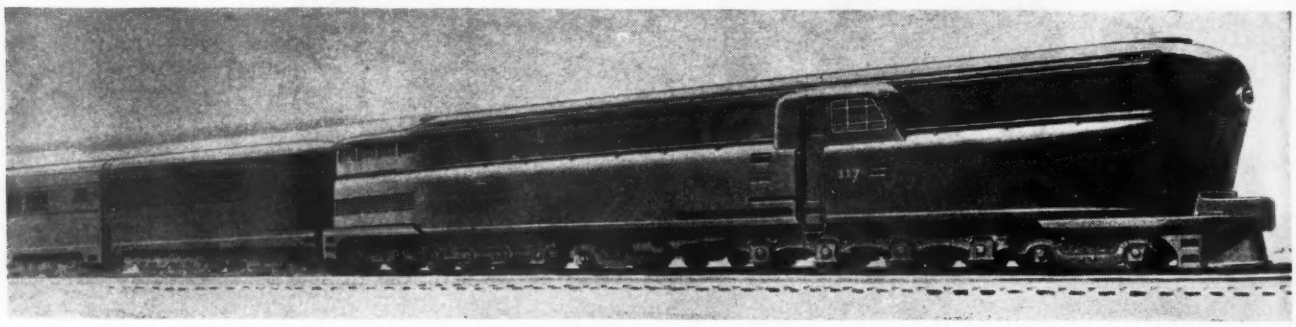
The Southern Coal Producers' Association petitioned NLRB March 9 to abandon plans for a strike poll of the miners on March 28 on the ground that no dispute existed Feb. 26, when U.M.W. filed a notice of dispute and that none existed then (March 9) within the meaning of the War Labor Disputes Act. Edward R. Burke, president of the association, said that if the board did not grant his plea he would appeal to the Federal District Court.

The Labor Department, NRLB and WLB rejected the southern operators' petition March 12 and upheld the right to poll the mine workers to see if they wanted to strike if their contract demands were not met.

New Locomotive Type Announced by R.R.'s

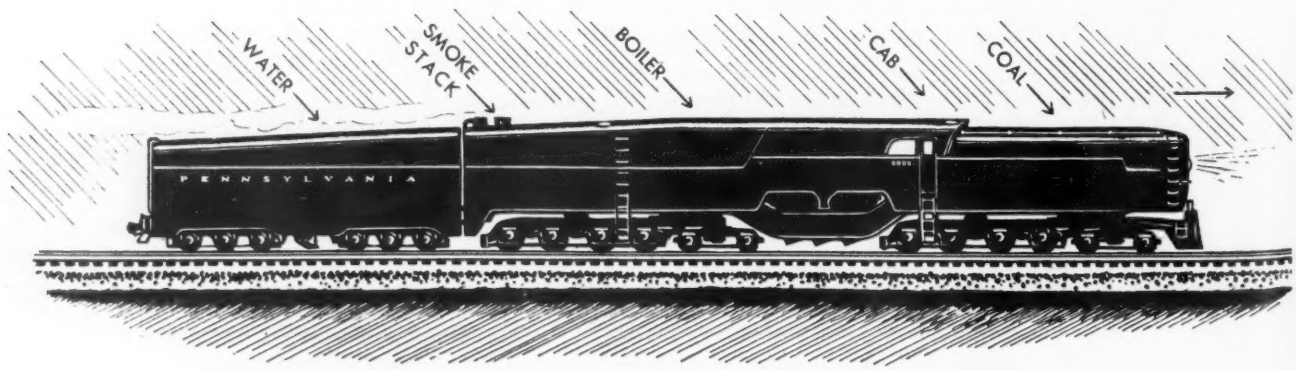
Pennsylvania R.R. engineers have designed a new type of powerful high-speed coal-burning steam-turbine locomotive for both passenger and freight service which, because of its unusual appearance, has been designated the "Triplex." In this engine, the usual arrangement of the main sections will be completely changed. At the head will be a large coal compartment followed by a cab and boiler section, with the cab at the front and the smokestack at the rear. The whole combination will be supported by a cast-steel frame mounted on two swiveling trucks, one under the coal compartment and the other under the boiler. Each truck will consist of four pairs of driving wheels and two pairs of guiding wheels. Behind the boiler will be coupled a water tender.

A direct-drive steam turbine will be geared to the driving wheels of each of the two swiveling trucks and the pair of turbines will together produce 9,000 hp. A new development in the Pennsylvania's program of improving the design and performance of the coal-burning steam engines, this is the third new design recently announced. It will cover nearly 137½ ft.



C. & O.'s NEW STEAM-TURBINE-ELECTRIC

One of three to be built by Baldwin Locomotive Works and Westinghouse Electric & Mfg. Co. This locomotive can do more than 100 miles an hour under full load. Coal is carried in the head of the locomotive; boiler is behind engineer's cab; electric motors in rear.



PENNSYLVANIA R.R.'S NEW COAL-BURNING STEAM TURBINE LOCOMOTIVE

Departing from previous ideas of arrangement in its main sections, the "Triplex" has been designed for fast heavy-duty freight and passenger service. Coal will be carried in front and water supply in the rear.

SIMPLEX-ANHYDREX UNDERGROUND CABLES

NEED NO PROTECTION FROM *Moisture*

Underground cables for electrical distribution are exposed to moisture which can cause a lot of trouble and seriously **interfere** with service. Metallic sheaths will keep moisture out of the cables but they often create other problems of electrolysis, corrosion, sheath losses and maintenance. A flexible, non-metallic covering, such as a rubber sheath, that will not absorb water is the ideal protection.

Simplex-ANHYDREX Underground cables are now made with synthetic insulations and sheaths that are suitable for underground service in ducts or directly in the ground. Exposure to moisture, even permanent submersion in water, has no effect upon their electrical stability. For steady, uniform underground distribution Simplex-ANHYDREX Underground cables are what you need.

Our experience with low water absorption insulations over many years is at your service whenever moisture creates a cable problem for you.

Buna S has replaced natural rubber in Simplex insulations.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

Simplex WIRES and CABLES

of track from front to rear, with a wheel-base of 122½ ft. However, the swiveling truck will permit its operation around any curve that can be negotiated by a passenger coach.

The coal compartment will hold 32½ tons of fuel, while the water tender will carry 21,000 gal. The coal compartment, in addition, will have space for water, and as the fuel is consumed water will be automatically transferred from the tender to maintain constant weight on the driving wheels of the leading truck. When coal and water are taken, the water that has been transferred will be automatically returned to the tender. The use of geared turbine power, eliminating the familiar piston rods and other reciprocating parts of the conventional steam engine, will make possible the use of smaller diameter driving wheels, which will permit larger boiler capacity for the same road clearances and improve the locomotive's efficiency, it is said.

Fifty multi-cylinder steam locomotives able to pull full-length passenger trains at speeds up to 100 miles an hour, and freight trains on fast schedules, have been ordered by the Pennsylvania, it was announced March 27. Twenty-five engines will be built by the Baldwin Locomotive Works and 25 engines and 50 tenders in the P.R.R. Altoona (Pa.) shops. The new locomotives will go into service this year. Known as T1, the new engines will be used on main lines west of Harrisburg, Pa.; two already have been built and have been in use for some time.

Chesapeake & Ohio Ry. asked WPB for permission March 28 to build three coal-burning locomotives designed to use, in combination the best features of steam, turbine and electric drive. Each will convert the heat energy of coal and steam into 6,000 hp. delivered from a turbine to generators for the electric motors that drive the wheels. It will be capable of more than 100 miles an hour under full load, with high sustained speeds even on grades. Baldwin Locomotive Works will build the new motive power in cooperation with C. & O. mechanical officers. The steam turbine and electrical equipment will be built by Westinghouse.

The cab will be near the front end of the locomotive, giving the engineer a protected position with good forward vision. The coal supply will be carried at the head end of the locomotive; the boiler will take up the center section behind the engineer's cab. The steam turbine and electric generators will be at the rear and will feed 4,000 kw. of electricity through motors mounted on each side of the driving wheels.

•

Buys Wagon Mine

Moss-Williams Coal Co., Harlan, Ky., has purchased the Royce-Kershaw Coal Co., Partridge, Ky., a wagon mine that is reported to have been getting out about 500 tons of coal a day. The new owner plans to increase the mine's capacity and probably will mechanize it. The coal is trucked to Cumberland, where it is loaded in cars.

SFA Program for New Fuel Year Stiffens Control as Supply Wanes

Solid Fuels Administrator Harold L. Ickes on March 15 gave out a summary of the government's complete program to provide for equitable distribution of the available supply of solid fuels all the way from mines to consumers in the 1945-46 fuel year beginning April 1. As part of the program he ordered producers to allocate enough eastern and midwestern soft coal to retailers dependent upon these coals to supply them generally with 80 percent of the tonnages they received during the specified base years. Producers also were directed to give priority to retail dealer orders second only to the special-purpose bituminous coals essential to the steel industry and for other vital war uses.

The principal part of the program, which is necessitated by serious shortages of the major solid fuels, is embodied in four new SFA regulations. Two other regulations, approved previously, laying the basis for allocations of special-purpose coal and of coal to be transported on the Great Lakes, comprise the remainder of the program.

Besides the allocation and priority for retail trade the newly announced program includes the establishment of a restriction area in which household consumers generally will be limited to receiving 80 percent of their requirements in 1945-46. Household and other domestic consumers of all forms of solid fuels in the restricted area will be required to file "consumer declarations" with retail dealers before receiving deliveries. The restriction area includes all territory east of the Mississippi River and Minnesota, North and South Dakota, Iowa, Louisiana and the city and county of St. Louis, Mo. Because solid-fuel supplies are less critical in the remainder of the United States, there are no limitations on retail deliveries elsewhere except those applied by the Office of Price Administration in the Pacific Northwest.

Other principal features embodied in the latest regulations include:

1. Limitation of anthracite dealer quotas to 80 percent of the dealer's receipts in a base-year period.
2. Giving a third priority on soft coal to be moved on the Great Lakes. The lake movement is to be completed by Nov. 17.
3. Continuation of tight controls on industrial coal distribution and stockpiling.
4. Requiring that "over-the road" anthracite truckers secure SFA licenses to assure more equitable distribution by truck and by rail.
5. Encouraging some spring and summer storage of solid fuels by as many consumers as possible under present conditions of short supply. This will assure that most consumers can have some coal in their bins before the next burning season.

To assure every consumer an opportunity to get some coal in his bins before next winter, the new program requires retail dealers to give their regular customers at least 30 percent of their annual requirements by Sept. 30 if they file their declaration and an order with the dealer prior to May 15 and are willing to accept any usable fuel. Also, to make certain that the supply is equitably spread, dealers are prohibited from giving any household consumer more than 50 percent of his annual requirements before Sept. 1 without government approval.

Dealers are obligated to supply 80 percent of normal requirements in 1945-46 to their regular customers who promptly file a declaration and an order and are willing to take any usable fuel.

They are directed not to accept any new business, either industrial or domestic, that would impair their ability to furnish either the 30 percent or the 80 percent quotas to their regular customers. However, where their supply permits them to accept new customers who file declarations and orders with them promptly, they then are obligated to supply the new customers exactly as they supply regular customers whom they served in 1944-45. Consumers who are unable to find a dealer to accept their consumer declaration and order for coal may apply to the nearest SFA Area Advisory Committee or field office for aid.

A few fuels available in the restricted area are considered "less scarce" by the regulation. Where these are obtainable, consumers are permitted to receive up to 100 percent of their annual requirements in these fuels. They may also use them to supplement the 80 percent they are permitted to obtain in the scarcer fuels.

Listed as "less scarce" are rice-sized anthracite, reclaimed and run-of-oven beehive coke, bituminous coal produced in Michigan or Iowa, lignite, Virginia anthracite and Bernice coal produced in Pennsylvania. No limitations are placed on certain small industrial sizes of anthracite in which surpluses will exist.

The new retail control places the 80 percent over-all restriction on deliveries for use in a house, apartment, hotel or other dwelling; in schools, churches or meeting houses, court houses, prisons, police and fire stations, libraries, museums, banks, offices or office buildings, stores and retail establishments of all kinds (except commercial bakeries or laundries), passenger terminals and depots of all kinds, warehouses, garages, restaurants, taverns or bars, gymnasiums, auditoriums, theaters, clubs or lodge houses or rooms, places of amusement, dancing studios, zoos, stables, kennels and in any building or plant not specifically mentioned in which solid fuel is used only for space heating, the domestic heating of water or domestic cooking.

Solid fuels for the armed services, Veterans Administration, United States Maritime Commission, Foreign Economic Administration, War Shipping Administration and for use on commercial vessels and as bunker fuel are exempt from the limitations. However, these users are expected to restrict their consumption to a minimum. Hospitals and homes for the infirm and employees of producers living

HOW TO GET A PRIORITY

on Tomorrow's Coal Markets

BETTER PREPARED,* more uniform coal is the only priority needed to control post-war markets.

Clean coals of low impurity content, uniformly sized, have always brought the best prices—the most customers—the highest profits. They will again!

Morrow Tipples Improve Quality, Raise Product Value, Cut Operating Costs

About ⅓ of the mines in this country are mechanized. Of that ⅓ a very high percentage are Morrow equipped. That's because Morrow *streamlines production of coal* from the mine, through most modern, efficient preparation equipment, to cars and barges, in shorter time, at lower operating costs—*in best condition to* SELL!

Morrow engineers are available *now* to design and equip more efficient preparation plants for post-war operations. Ask Morrow to assign an engineer to study your situation. Write the Morrow Manufacturing Company, 1942 Ford Boulevard, Wellston, Ohio. *Division The Wacker Corporation.*

* Better Preparation
= *INCREASED SALES!*

1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
CONVEYORS • LOADING BOOMS • SHAKING SCREENS
VIBRATING SCREENS • CAR HAULS • PICKING TABLES
SETTLING TANKS • ELEVATORS • CAR RETARDERS
PERFORATED METAL SCREENS • STEEL STRUCTURES

in the mining areas are permitted to obtain their full annual requirements.

The regulation sets up schedules for shipments of soft coal from the mines to retail dealers during the warm months. Dealers are assured of getting sufficient coal during the summer stocking period to meet their minimum obligations to customers. Anthracite producers and wholesalers are required to fill orders of dealers in equal monthly shipments as far as possible.

Coke producers serving the domestic trade and producers of briquets and processed fuels will be required to keep the government fully apprised of the supply of those fuels and of their distribution programs in the restricted area. This will permit a closer supervision of the entire solid fuels supply, in the interest of equitable distribution. Coke made from petroleum is treated, under the regulation, in exactly the same way as coke made from bituminous coal.

SFAW Regulation No. 19, requiring retail dealers handling Utah coal to receive it in equal monthly shipments during the coal year, has been extended another year until March 31, 1946.

Priority List Drawn Up

A priority list that can be used, if needed, to parcel out coal to users in the order of their essentiality during periods of emergency was announced March 6 by the War Production Board in a move brought about by an increasing shortage of the fuel. The list was prepared by WPB at the request of the Solid Fuels Administration for War because of coal shortages threatening urgent war and civilian needs. It will be applied only if local or national shortages assume serious proportions. The list by classes is as follows:

Class 1. All plants only to the extent necessary to prevent "irreparable damage" to equipment that may result from an inadequate use of coal, with coke, steel and glass plants given as examples of this group.

Class 2. Bunker fuel if less than seven days' stockpile, on the basis of average requirements, is available; railroads also with less than a seven days' supply, including that on the ground and on the track, available; and public utilities, including gas, electric light and power, street railways, communications, waterworks and sewage-disposal plants, if less than ten days' supply is available.

Class 3. Minimum requirements for hospitals and similar institutions, central steam plants, domestic households, military cantonments, Navy stations and other living quarters, hotels and apartments during the heating season.

Class 4. Critical plants and services that receive from WPB certification of eligibility for coal deliveries in this class, which will include plants and products specified in the current national production urgency list and plants equally essential in war production.

Class 5. Manufacture of any product or the conduct of any business or activity not previously covered herein, rated AA-1 for maintenance, repair and operating supplies as set forth in program determination No. 500-B and reflected in CMP regulations numbers 5 and 5-A, and Orders P-56, P-68, P-98-b, and P-142; and minimum requirements after "all possible curtailment" for office buildings, restaurants, passenger stations, and manufacturing plants using coal only for space heating.

Class 6. Manufacture of any product or conduct of any business or activity not previously covered herein, rated AA-2 for maintenance, repair and operating supplies as set forth in CMP Regulations Nos. 5 and 5-A, except schools and other public buildings not directly required in the war effort.

Class 7. Manufacture of any product, or conduct of any business or activity not otherwise covered in Classes 1 through 6.

Midwestern bituminous coal mines are being called upon by SFAW to provide more than 2,000,000 additional tons of coal for railroad locomotive fuel as part of the 1945-46 program to get maximum use from anticipated limited supplies, SFA reported March 20.

The 15 railroads and railroad systems that will use the extra midwestern soft coal will reduce their consumption of eastern bituminous coal moved via Great Lakes vessels by about 975,000 tons. The railroads also will reduce consumption of Appalachian coals shipped to them by all-rail routes approximately 1,185,750 tons from 1944-45 fuel year rail-hauled tonnage.

Under the new program the affected railroads will take 4,354,000 tons of eastern-mined soft coal via lake vessels during the 1945-46 fuel year as against the 5,329,000 tons shipped by water that they consumed in the 1944-45 fuel year. The railroads will haul by rail from the East some 15,423,906 tons for their own use in the 1945-46 fuel year, as compared with 16,609,656 tons moved all-rail in the 1944-45 fuel year.

Simultaneously with this announcement, Deputy Solid Fuels Administrator Charles J. Potter said that producers of bituminous coal will be permitted, on and after March 21, to ship soft coal to Great Lakes loading ports for transshipment in cargo vessels prior to April 1, without having to obtain written permission from the SFA area distribution manager for the district in which it is produced. The order granting this permission (SFA Order No. 21) revokes a notice of direction issued Feb. 26, which required producers of bituminous coal to obtain written authority before forwarding coal for transshipment on the lakes.

•

Pocahontas Buys Large Timber Tract

Pocahontas Fuel Co., Pocahontas, Va., has acquired 46,000 acres of timber land in Bland County, West Virginia, and plans a large reforestation program. The tract will be used to supply mine props, cross headers, ties and other timber needed around tipples and other outside work. The company, it is said, will engage a trained forester who will devote full time to upkeep. Crews are to work constantly setting out seedlings and protecting their growth from fire and other sources of devastation.

•

New Producers Being Developed

White Rapids mine is to be developed at Nanaimo, B. C., by Canadian Collieries (Dunsmuir) at a cost of about $250,000. It is expected that on completion of development 550 tons daily will be produced, with operation continuing for five years.

Thanks to a government appropriation of $100,000 providing a mine access road to Echeta, 25 miles west of Gillette, Wyo., the new mine of the Echeta Coal Co., in Campbell County, Wyoming is running near capacity, tapping a 30-ft. seam.

•

Tri-State Co. Mine To Be Closed

Tri-State Coal Co., which operates the Keystone mine, at the east city limits of Henderson, Ky., will cease operations and the mine equipment be dismantled, it was announced March 23 by Vice President R. L. Brown. J. C. Trader is president and Neeley Jones, secretary-treasurer and superintendent. The company employs 48 miners.

•

77 Koppers Workers Get Long-Service Pins

Seventy-seven coal-mine employees with 25 to 45 years of service with the Koppers Coal Division, Eastern Gas & Fuel Associates, or predecessor companies have been awarded service pins, according to L. C. Campbell, vice president. A total of 2,525 years in mining is represented. Two men who have each established 45-year records are William D. Tyree, 60, mainline trackman at Carswell mine, and Hix Austin, 57, tippleman at Keystone mine, both in McDowell County, West Virginia.

•

Start Oldroyd Tipple

Construction of a new steel tipple at the Oldroyd Coal Co., Pana, Ill., was begun March 2 when a crew started preliminary work on placing new steel uprights over the mine shaft. A fire Feb. 12 almost destroyed the superstructure.

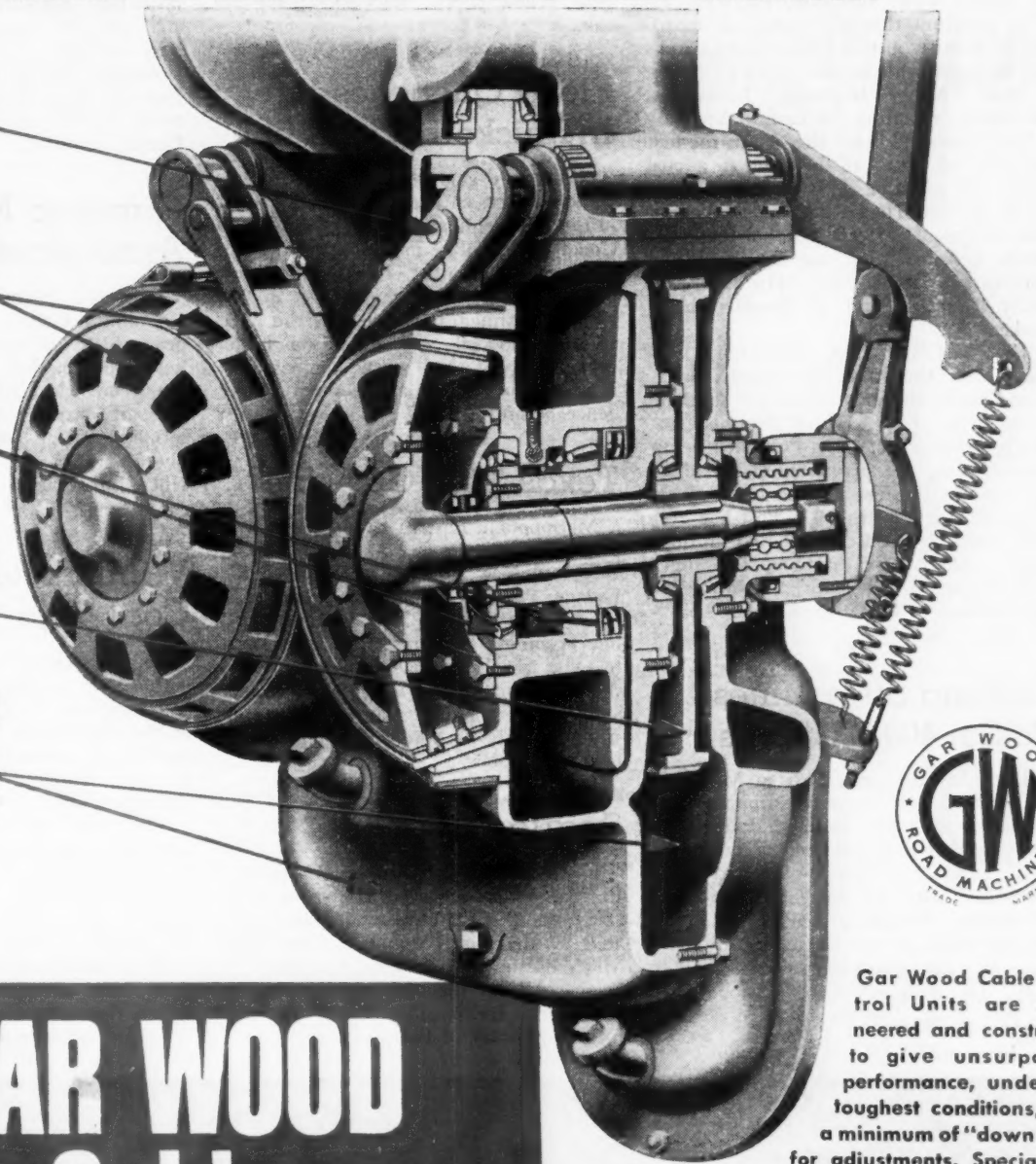
•

Mine Collapse Kills 5

Five coal miners were killed March 12 when a section of the Crucible Fuel Co. mine, Crucible, Greene Co., Pa., collapsed. The bodies of all the victims were recovered. The cause of the fall was not determined.

More Loads per Day!

MORE OPERATING DAYS PER MONTH!



Servo-type self energizing brakes.

Outside clutches and brakes for accessibility. Self-ventilated for cooler operation.

Cable load is taken directly from drum to housing thru tapered roller bearings.

All gears are spur-type requiring minimum of adjustment.

Sturdy steel housing prevents excessive distortion of parts. Provides lubrication chamber for entire unit.

GAR WOOD GW ROAD MACHINERY TRADE MARK

GAR WOOD Cable CONTROL UNITS

Gar Wood Cable Control Units are engineered and constructed to give unsurpassed performance, under the toughest conditions, with a minimum of "down time" for adjustments. Special emphasis is placed on sturdiness to avoid excessive distortion of case and parts. Every minute detail of this smooth-running unit has plenty of trial and proof back of it. Remember that Gar Wood is the world's largest manufacturer of winches, with years and years of experience. You'll get MORE out of your machines (regardless of make) with a Gar Wood Cable Control Unit. That's not only our claim . . . ask any user.

AC

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Blood Plasma Used In Mine Injury Case

Pittsburgh Coal Co. has been commended to State Secretary of Mines Richard Maize of Pennsylvania for using blood plasma at the scene of an accident to save the life of a seriously injured worker at Euclid mine, Smithton, Pa., Feb. 22. The company, through its medical department, recently installed blood-plasma units for emergency use at each of its 17 mines.

State Mine Inspector James R. Walthour, reporting the case to Secretary Maize, expressed belief that it was the first instance of blood plasma use at a coal mine. The victim of the accident, James Bush, 28, Fitz Henry, Pa., was working at the bottom of a 189-ft. coal-hoisting shaft when he was struck on the head and shoulders by falling ice. His head was badly lacerated and a shoulder blade broken.

Dr. McClain Post, Smithton, who arrived on the scene 10 minutes later, found the miner unconscious and suffering from severe shock. Usual treatment for shock had no effect. Dr. Post then began administering the plasma from the mine kit. It was the first time in his 15 years of medical practice that Dr. Post had ever used plasma. The treatment took an hour and a quarter. By that time the miner had responded sufficiently to permit his safe removal to the hospital.

•

Indiana Strip Mines To Set 400,000 Trees

Tree planting began early in March at the Sunlight and Tecumseh stripping operations, in Warrick County, Indiana, a month earlier than last year, according to L. E. Sawyer, in charge of forestry and recreation work for the State strippers' association. Despite an acute labor shortage, the mines around Boonville will plant their full quota, totaling about 400,000 trees. The local high school is cooperating by permitting students to assist in the work.

Besides the regular planting, the companies this year are establishing experimental plots in cooperation with the Central States Forest Experiment Station to determine which trees will produce higher yields in the future. Four varieties of pine —shortleaf, loblolly, pitch and Virginia— are being set out along with native hardwoods—cottonwood, soft maple, sweet gum, yellow poplar, black locust and red oak.

•

Flood Quenches Fire In Knickerbocker Mine

Miners are gradually returning to their working places in the Knickerbocker mine of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., in which fire was discovered in November, 1944. Direct fire-fighting methods proving futile in the effort to extinguish the flames, the operation was flooded. Dewatering was begun in January last, and when completed an inspection of the fire area showed no evidence of fire.

•

Texas-Ohio Gas Line?

Metropolitan Eastern Corp., a new concern with home offices in Wilmington, Del., and New York City, has asked the Federal Power Commission to authorize construction of a $23,500,000 18-in. pipeline extending 825 miles from east Texas to Ohio to relieve what it calls a wartime shortage of natural gas in Ohio and nearby States. The applicant plans to begin construction early in April and complete the line in October.

•

Sparta Mine Sold

Forsyth Carterville Coal Co., Carterville, Ill., has purchased the assets of the mine at Sparta, Ill., that was owned and operated by the Gulf, Mobile & Ohio R.R. Much of the miscellaneous equipment is being sold, but the coal washing plant is being held for possible service at some future operation of the purchasers.

Cedar Canon Mine Leads State in Safety

Cedar Canon mine, Florence, Colo., operated by Giuliano & Sons Coal Co., took first place in the semi-annual—July-December, 1944—mine safety contest conducted by the Colorado State coal-mine inspection department. The mine operated 110,009 man-hours without a serious accident. Frederick mine of the Colorado Fuel & Iron Co., was second; imperial mine, Imperial Coal Co., Erie, third; Graden mine, Graden Coal Co., Dacone, fourth.

•

Gamerco Mine Announces Closing

Operations at the Gallup American Coal Co. mine at Gallup, N. M., were to be suspended the last week in March, "due to loss of our markets," according to an announcement March 1 by Clarence Uhland, assistant general manager. The mine formerly was an important source of supply for the Santa Fe railway, said Mr. Uhland, but the railway gradually has been converting to diesel use.

•

Winners Receive Coal Age Awards

Special presentation ceremonies and an enthusiastic reception by both individuals and companies have followed in the wake of the distribution of *Coal Age*'s "Coal-for-Victory" awards, forwarded last month to 116 winning mines and collieries throughout the United States.

The awards were presented by *Coal Age* with the support and cooperation of the Solid Fuels Administration for War for increased efficiency, production or both. Judging of entrants' qualifications was completed in February and certificates, both to mines and to members of supervisory staffs, were forwarded to the winners shortly thereafter.

Several of the companies operating win-

Management and men of the Zeth Coal Co., Hopewell, Pa., are shown here gathered together to receive three awards honoring the company's achievements during 1944. The company won both the Victory Coal Production and the War Production Efficiency awards offered by Coal Age and also the Coal Operators Casualty Co.'s Certificate of Merit for its safety record. The ceremonies, in which public officials, officers of the company and a representative of the union took part, were held at the drift mouth at the end of the day shift.

★ To increase strength without increasing weight

★ To reduce weight without reducing strength

★ To insure high resistance to corrosion, abrasion, shock, and fatigue

U·S·S High Strength Steels

are again available

NOW, with the release of these low-alloy, high-strength steels for use in coal mine applications, you can once more obtain the operating advantages that will put your equipment on a postwar basis.

The steels in this group—of which U·S·S COR-TEN is an outstanding example—are primarily distinguished for their high strength and low cost. But each has in varying degrees other desirable properties—increased resistance to corrosion—high fatigue strength—resistance to impact, vibration and abrasion—easy fabrication. Thus you can obtain, in one steel or the other, whatever particular *combination* of properties are needed to insure top performance in fabrication and service.

There's nothing new or untried about these U·S·S High Strength Steels. In thousands of applications—in mine cars, steam shovels, grab and drag line buckets, in skip hoists, conveyors, and screens they've proved their ability to make equipment more efficient. Able to do more work. Longer lasting. Cheaper to operate. Less likely to break down.

Our metallurgical specialists will gladly go over your requirements and tell you what particular grade of U·S·S High Strength Steel will give you best results at lowest cost.

25% lighter—weight saving counts here

Sturdy construction with U·S·S High Strength Steel gives this husky dump-type trailer the high resistance to wear, shock and fatigue that keeps it on the job. The 3,750 lbs. dead weight saved in the body construction shows up in gasoline and oil savings as well as in reduced tire and brake maintenance costs.

AMERICAN STEEL & WIRE COMPANY, *Cleveland Chicago, New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

USS STEEL UNITED STATES STEEL

UNITED STATES STEEL

SCHRAMM
SCHRAMM
METAL GOES TO WAR . . .
AIDED BY COMPRESSED AIR
by Schramm
The tremendous demands made for increased production of metals have created activities in the ore mining fields that are unprecedented. The illustration shows how metal mining is made easier and faster by Schramm Air Compressors furnishing air for driving a wagon drill in open pit work.
Schramm Compressors are used by the metal and coal mining industry because they are sturdy, rugged and yet lightweight and easy to move anywhere on the job . . . plus . . . they are 100% water cooled . . . have easy starter push-button control . . . work equally well with doors closed, a feature which keeps out dust and prolongs the life of your compressor.
Schramm Air Compressors are today used in mines throughout the country. Write for complete details.
SCHRAMM INC.
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

MEETINGS

- **Anthracite Conference, scheduled for May 3 and 4, Lehigh University, South Bethlehem, Pa., has been postponed.**
- **American Mining Congress: Coal Mine War Conference, scheduled for the week of May 14 at Cincinnati, Ohio, has been cancelled.**
- **Big Sandy-Elkhorn Coal Operators' Association: annual meeting, June 3, Ashland, Ky.**

ning mines held special dinners at which the awards were presented, while others gave them out at monthly safety meetings or at other gatherings of the supervisory staff.

Stimulation to production and increased morale among both supervisors and employees as the result of recognition of their efforts were mentioned by several companies in commenting on the awards. Typical of such comments were these:

"The effect from a morale standpoint should be far-reaching . . . I know that every one of our men who receive the awards will prize them highly and I am glad that your program has made it possible for us to give them something tangible in recognition of the important part which they are playing in the national effort."

"This contest, if we may call it that, has been helpful with our supervisors and employees and has contributed to increasing our production and improving our efficiency.

"I am pleased to report that the employees were exceedingly pleased with the awards."

A continuing effect of the awards was noted by another company which wrote:

"Our tonnage has held up well so far in 1945 and we are hopeful that the 'Coal-for-Victory' award will improve the morale of our organization to a point that we may even exceed last year's production."

Other typical comments included:

"We appreciate this very much and are having the same framed and posted in our mine offices."

"We feel delighted to receive the Victory Production Award. Just wonderful."

"I am most pleased that we have been able to achieve the results expected of us."

"You and your committee are to be highly commended for the time and effort which you have given to this matter, and we wish to assure you of our sincere appreciation."

"We want you to know that we are highly pleased to receive these awards."

"We have received the very beautiful certificates of award and they are highly regarded by each of the individuals to whom they were presented, as well as the group."

"I can assure you that the news of the awards and the pins were received with enthusiasm."

"We are pleased to report that the award presentation and the dinner last evening was a success."

New rope or old . . . you want

SAFER HANDLING

. . . Men and equipment need the increased protection of *PREFORMED* YELLOW STRAND

"Wire rope *safety?* Well," someone says, "we caution operators . . . keep equipment in repair . . . select rope of adequate strength and proper wire-and-strand construction. What's missing?" Just one thing: see that the rope is *Preformed* Yellow Strand.

Yes, this flexible, kink-resistant line that doesn't go out of control adds to safety. Its *manageability* comes from the factory *preforming* that dispels the inner tension of parts.

If you're cutting, splicing or reeving a rope, the same docility eliminates the necessity of serving the ends. Wires and strands that don't unravel are safer to handle.

And when long-lived *Preformed* Yellow Strand eventually nears retirement, still another safeguard appears. Surface wires that wear through are disposed to lie flat and remain harmless. They don't follow the unpreformed tendency to wicker out in jagged points, endangering workers' hands and adjacent wires, sheaves and drums. Men use *preformed* rope confidently, efficiently.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Wire Rope for Mining" contains useful facts, tables, pictures. Write for your copy.

ARMY E NAVY

BRODERICK & BASCOM

Yellow Strand

PREFORMED WIRE ROPE

CUT PRODUCTION LOSSES

Here's why Deltabeston performs with the utmost dependability where many other cables soon become unfit for service.

1. Very soft, small copper strands—for greater flexibility and to withstand vibration.
2. Heatproof felted asbestos—for protection against overload conductor heat.
3. Varnished cambric—for moisture resistance and high dielectric strength.
4. Felted asbestos—for extra protection against high ambient temperatures.
5. Asbestos braid—for high resistance to heat, moisture, oil, grease and most corrosive vapors.

REWIRE WITH DELTABESTON

Are heat, moisture and corrosive vapors causing unexpected cable failures in your cutting, hauling and loading equipment? Everytime an electrical cutter, mine locomotive or mechanical loader is hauled to the repair shop, urgently-needed production suffers.

Production losses due to power failures can be cut to a minimum by rewiring with Deltabeston Apparatus or Motor Lead Cables. These asbestos-insulated cables are designed for wiring low-voltage apparatus in mines, collieries and in other installations where difficult operating conditions are encountered. Deltabeston is highly resistant to heat, flame, moisture, oil, grease and most corrosive vapors.

For additional information write to Section Y-451-10, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn. Deltabeston Wires and Cables are distributed nationally by Graybar Electric Co., General Electric Supply Corp., and other G-E Distributors.

BUY WAR BONDS AND KEEP THEM

GENERAL ELECTRIC

NLRB Permits Foremen to Organize

Foremen received permission March 26 from the National Labor Relations Board to organize for collective bargaining purposes. In a 2-1 decision that reversed a position taken two years ago NLRB directed an election at the Packard Motor Car Co. in Detroit to determine if 1,100 supervisory employees want to be represented by the Foremen's Association of America, an independent union that conducted a series of strikes a year ago in an effort to obtain recognition.

Gerard D. Reilly dissented, stating the majority decision "smacks of a peace-at-any-price policy." He urged Congress to give the NLRB the same power to invoke judicial process against recalcitrant labor organizations as the board now possesses with regard to disobedient employers.

The decision marks a striking victory for the Foremen's Association, which lost its fight for recognition on May 1, 1943, when NLRB ruled in the Maryland Drydock Co. case that foremen did not constitute an appropriate bargaining unit. Subsequently F.A.A. had petitioned NLRB for 20 elections in Detroit plants.

In handing down the majority decision, Chairman Harry A. Millis and Member John M. Houston stressed that foremen today find themselves in much the same working situation as rank and file employees. "Whereas he was formerly an executive with considerable freedom of action, he is now an executive carrying out orders, plans and policies determined above. He is more managed than managing," the majority declared.

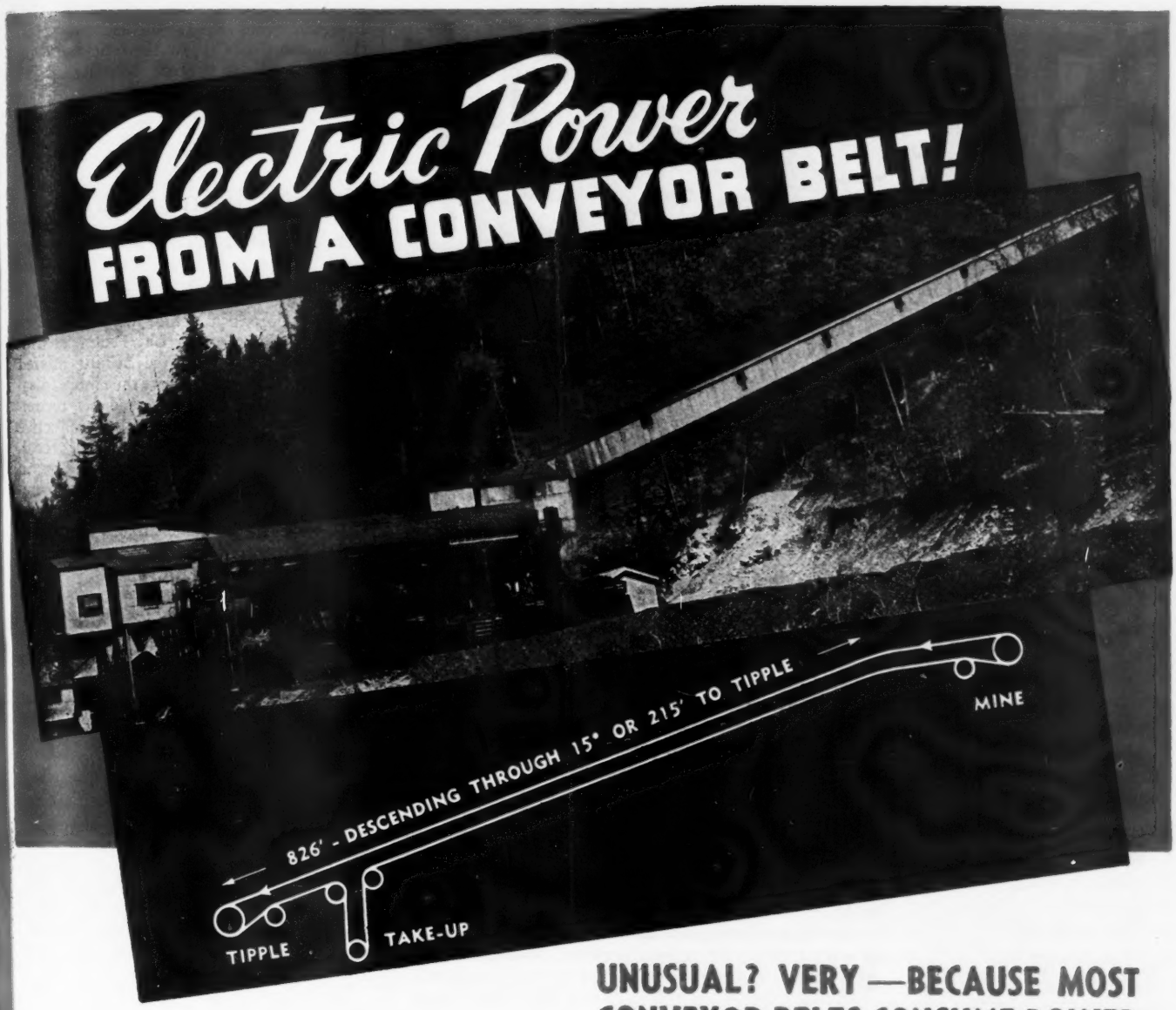
•

Strike Vote Asked In Anthracite

Following the pattern already set in the bituminous industry, John L. Lewis on March 27 notified the Department of Labor, the War Labor Board and the National Labor Relations Board that a dispute existed in the anthracite region. In line with these agencies' practice of accepting such notification as evidence of a dispute, machinery will be set up for taking such a vote at the end of the 30-day "cooling-off" period provided by the War Labor Disputes Act. Operations of the Philadelphia & Reading Coal & Iron Co., already under government control, were exempted from the notice, meaning that its reported 10,000 employees will not participate in the vote with some 62,000 other anthracite miners.

A committee of seven anthracite operators has been named to negotiate with the United Mine Workers on a new wage agreement to succeed the present one expiring April 30. The committee includes W. W. Inglis, president, Glen Alden Coal Co. (chairman); H. J. Connolly, president, Pennsylvania Coal Co.; James Prendergast, president, Susquehanna Collieries Co., northern field; J. B. Warriner, president, Lehigh Navigation & Coal Co.; C. A. Garner, vice president, Jeddo-Highland Coal Co., middle field; Ralph E. Taggart, president, Philadelphia & Reading Coal &

Electric Power FROM A CONVEYOR BELT!



UNUSUAL? VERY—BECAUSE MOST CONVEYOR BELTS CONSUME POWER

At the Jewell Ridge Coal Company's mine at Tazewell, Va., coal is delivered to a conveyor belt which descends 215 feet, at a 15-degree slope, through a distance of 826 feet to the tipple below.

A regenerative motor starts the belt, but with full load and speed the motor automatically functions as a dynamo, generating a constant 30-kilowatt flow of electric power, and providing perfect speed control drag.

This was not only an unusual but a brilliantly successful integration of mine topography and sound engineering.

The belt is of Bull Dog quality, 48" wide, total overall length 1843 feet, and was vulcanized endless on the job by BWH engineers.

It is now over 7 years old and has stretched less than 3 feet though 10 times that amount was provided for. It looks as good as new and its eventual retirement is not foreseeable. Surely, this was straightforward belt building.

Whenever belts must possess the unusual in stamina, dependability and character, be sure to consult our nearest distributor and field technician, or write us direct.

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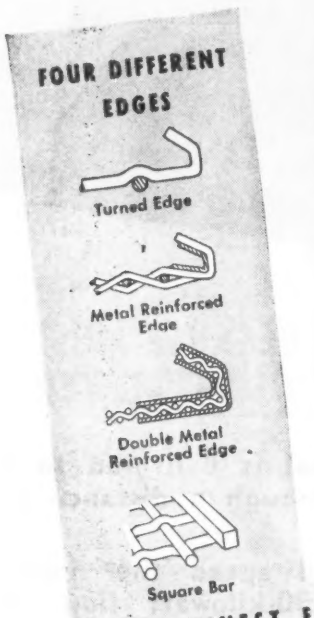
Works: Cambridge, Mass., U.S.A. — P.O. Box 1071, Boston, Mass., U.S.A.

Made to Order **FOR HE-MAN JOBS**

ROEBLING Vibrator or Shaker Screens



NO NEED TO WORRY about screening troubles with Roebling Vibrator or Shaker Screens on the job. They're ruggedly built to take on tough assignments... Mesh remains uniform throughout efficient, dependable and lasting service.

Write your own ticket when it comes to specifications. Roebling Vibrator or Shaker Screens are *made to order* for *your* special needs... in any kind of metal and a choice of edges... from 6-inch openings to 325 mesh, from 1-inch wire diameter to .001 inch.

And behind them is the Roebling name, symbol of wire quality for over a century. Whatever your filtering, sizing, grading or cleaning problems, Roebling experience and skill can help solve them. Write for information.

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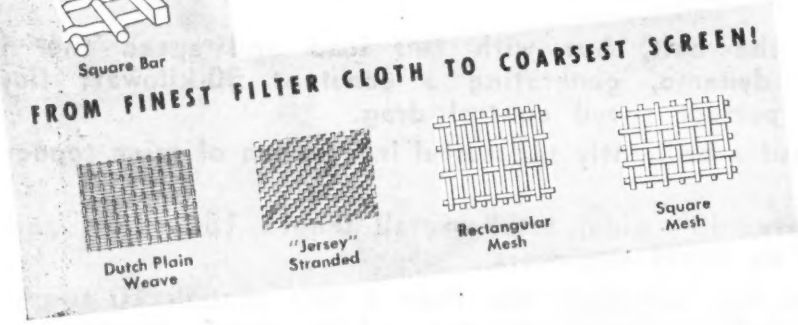

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PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • SLINGS • SUSPENSION BRIDGES AND CABLES
COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING

Iron Co., and R. L. Birtley, president, Hammond Coal Co., southern field. Negotiations for a new two-year contract to take the place of that expiring April 30 are slated to begin April 4.

•

Nationalizing Barred In British Report

Saying it did not believe that nationalization would solve the problem of steadily declining output, a White Paper published March 28 by the British Technical Advisory Committee on Coal Mining offered far-reaching proposals for the modernization of Britain's coal industry. It recommended an authority with really effective powers to reorganize the mines on a coalfield or area basis, with all the mines in each area merged together into one compact and uniform command of manageable size and with full responsibility, financially and otherwise, for the development of the area.

The report stated that there was scope for some extension in the use of the pneumatic pick. The need for locomotive haulage on straight, level roads also was stressed. It was pointed out that in the United States there was one haulage worker for every 50 tons of coal produced; in the Netherlands, one for every 20 to 25 tons, and in Britain, one for every 5 tons.

In the matter of wages and hours, the report said that a general wage level for underground workers should be at least as high as in other industries demanding an equal degree of skill and effort. Double-shift working should be practiced at both new and reconstructed mines, and there was a strong case on technical grounds alone for the adoption of a five-day week of 8 hours per shift.

Post-war socialization of British public utilities, coal mining and inland transportation was urged March 28 by Herbert Morrison, Home Secretary and Labor party leader, in an address to a labor meeting at East Lewisham, England. This, he said, was one of the principles upon which the party would make its stand in the general elections.

Introduction of central heating in British homes being built to replace those wrecked by German air attacks, according to a dispatch to the New York *Times*, is a feature of the British coal industry's plan for peace-time markets being drawn up by the mine owners for presentation to the government. It is asserted by sponsors of the plan that 85 percent of the heat generated in fireplaces is wasted. The industry hopes to prove that the installation of steam, hot-water or hot-air heating in the average British home will enable residents to have warm homes without increasing the quantity of fuel they burn.

Another plan under consideration to rehabilitate the industry is to use part of the production of Germany's mines after the war for Britain's domestic fuel needs, while mines in Wales and other parts of the country ship their output to export markets. Other plans include intensive research into the use of coal as a source of supply for raw materials for nylon and plastics and for synthetic motor fuel.

AMERICA WANTS PROSPERITY

A BOOK to be published early in April by the McGraw-Hill Book Company carries the provocative title "Prosperity: We Can Have It If We Want It." Its authors, Messrs. Shields and Woodward, state in vigorously challenging terms their conviction that the United States will emerge from war with human, material and technological resources adequate to provide a nation-wide standard of living unprecedented in world history. They present, too, their formulation of the several policies and procedures which must be followed by government, business, and labor if we are to realize our potential for a high and sustained prosperity unmarred by prolonged periods of severe unemployment and business stagnation such as have haunted our economic past.

The specific proposals set forth will elicit both enthusiastic acclaim and acrid dissent, for the book deals in far from gentle fashion with many of the currently fashionable panaceas for assuring prosperity by magic formula. It examines, and discards as effective guarantors of prosperity, whatever their individual merits upon other grounds, programs for public works, slum clearance, subsidizing of small business, foreign loans, social insurance, deficit government spending, redistribution of income, the numerous formulae for monetary management, repeal of the anti-trust laws, or any of the loosely-phrased admonitions that government should do nothing and allow everything to take its course untrammeled by controls of any kind.

On the positive side, the book urges clear recognition of the fact that prosperity, under a system of business enterprise, depends primarily upon the existence of competitive incentives that spur capital investment to provide better tools and equipment, that improve organization and technology to insure continuously increasing productivity per man-hour of work, and that enlarge markets by producing what the consumer wants at lower prices to the end that real incomes may be increased.

In short, prosperity depends upon profitable and expanding business and employment opportunity, so it becomes the part of enlightened government, business, agriculture and labor policy to promote those measures which will forward rather than retard the major aim of expanding production.

However great the room for dissent upon the adequacy, or the phrasing, of the specific recommendations it makes, the approach of this book has one virtue of solid merit. It attacks positively the problem of what steps should be taken to achieve and hold prosperity rather than merely devising a poultice to be applied when and if we run into a decline.

Virtually all responsible spokesmen for government, and for business, labor, and agricultural groups, are agreed upon the goal of prosperity. Moreover, they agree that, insofar as possible, it should be achieved through the effort of private enterprise, with government intervention utilized only as a last resort. But despite this unanimity, almost all public discussion of the problem has concentrated upon the nature, the extent, and the timing of such government expenditures as may be found necessary to combat deflation. Since upon this question there is far from general agreement, our procedure has created an exaggerated sense of divergence in a field in which, so far as fundamentals go, we all are in accord to quite an unusual degree.

☆ ☆ ☆

No confusion should be caused by the fact that the generally current phrase for prosperity is "full employment." The latter phrase merely states the goal in terms of human values, which are good terms in which to state any goal. What matters is that we generally are agreed as to what we mean when we say that we want prosperity or full employment. Not only do we know what we mean, but within very rough limits we can give dimension to our concepts. There are a few whose appraisals are somewhat lower, but most competent estimators set the goals for about 1950 at an average annual employment in civilian jobs of between 55 and 57 million persons, with a gross national product of between $185 and $200 billion measured at 1943 price levels. This contrasts with the 1944 level of non-military employed of 51½ million, and a gross output for the end of 1944 of over $200 billion. It assumes a reduction of the average workweek to 40 hours.

It will take some such levels as these to provide employment for those who seek work, with only sufficient "frictional" unemployment (those temporarily listed as unemployed because of the normal turnover between jobs) to afford reasonable labor-market flexibility to both workers and employers. The non-military employment figures are generally consistent with the officially stated postwar goal of jobs for 60 million workers, since the latter figure is generally understood to be an estimate of the *labor force,* which includes members of the armed services and an allowance for frictional unemployment.

There are a number of reasons why the estimates cannot be figured more closely, and why no one can be very confident even of the validity of the stated limits. The chief points of doubt in the employment estimates relate to how many withdrawals there are likely to be on the part of women, oldsters, and youngsters, who now are in the labor force to a number more than 6 millions beyond normal expectancy; how many men will be retained in the armed forces; and whether the

postwar frictional unemployment should be calculated as approximating the current 1 million or the 3 million so-listed in the prosperous year of 1929. Additional uncertainties cloud the estimates of gross national product. Notable among them is the fact that no one is sure of the war's effect upon man-hour productivity trends, in view of the fact that half of our current output has consisted of products that had no substantial counterpart in our peacetime price or production series.

☆ ☆ ☆

Nevertheless, despite such qualifications, it is fair to say that we do have a general conception of the magnitude of our postwar goals. Although they are well within our production potentials as demonstrated in this war, they are formidably beyond any previous record of peacetime achievement. Only the most sanguine optimism could lead one to expect that they will be achieved without concerted will, planning, and cooperative effort. Only blind recklessness could engender confidence that once attained they will automatically be held, let alone expanded in normally healthful growth.

If we were to follow past patterns, our war-built boom would, after a period of uncertain length, collapse into disastrous depression. The very magnitude of our recent growth would contribute to the depth and duration of the subsequent trough. Yet a fall even to the level of our previous peacetime-peak-year 1939, has been estimated by The Federal Reserve Board to imply unemployment for between 15 and 20 million persons. If human values have importance, that is something that must not be allowed to occur. If business values have importance, we must not tolerate again such losses as occurred from 1930 to 1933, when sales over the four year period were $128 billion less than would have been provided if the 1929 level had held, and corporate profits declined from more than $7 billions in 1929 to an average annual loss of $1 billion over the next four years. A repetition of these things cannot be tolerated—*if foresight and cooperative effort can prevent them.*

☆ ☆ ☆

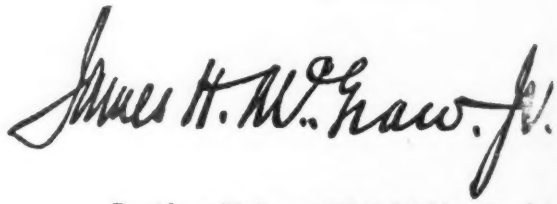
In January of this year Senator Murray introduced in the Senate a bill entitled "The Full Employment Act of 1945." It instructs the President to submit to Congress plans for eliminating both unemployment and inflation, including recommendations for correcting structural defects in the economic system. It provides for a Joint Congressional Committee to consider the proposals of the President, to take testimony from experts and the general public on these proposals or any others it may wish to consider, and after weighing all the facts to submit its findings to Congress. It provides for an advance budgeting of the constituent parts of a full-employment economy, and commits the Federal Government to provide, in advance, for sufficient expenditures (through private contractor channels) to make up for the gap between estimated private expenditures and the amount necessary to assure full employment.

By no stretch of the imagination can The Full Employment Bill, in its present form, be regarded as acceptable to business. Yet it may well present a test of whether or not American business can deal with problems in this area in a statesmanlike fashion. Such statesmanship will consist in demonstrating first, that the Bill is not acceptable because of deficiencies which preclude the possibility of its accomplishing the avowed purposes; and second, that business is able and anxious to offer constructive suggestions for remedying these deficiencies.

It is easy to point to weaknesses in the Bill. To mention only a few of major importance: The proposal to make advance Federal expenditures to compensate for estimated deficiencies in prospective private expenditures is completely impracticable. No one in the country can predict future trends with sufficient accuracy for this purpose; no one can tell what the constituent parts of a really high, *stable* peacetime budget should be, for in our boom-or-bust economy we have no stable pattern to project; no one can tell, within reasonable limits, how much the government should spend *in advance* to assure full employment. The Bill pronounces labor's right to work without defining commensurate responsibilities which it should exercise. It does not define the areas of proposed government expenditure in such a way as to allay business fears of government competition or the general public suspicion of leaf raking. Above all, the Murray Bill is defective in that, despite a somewhat vague pronouncement in favor of forwarding private business activity, it recommends a single specific designed to supplement such activity rather than stimulate it.

The very definition of certain of these faults suggests their remedies. But the positive task of stating how the Bill should be amended in order that it may have effective usefulness is far from simple. Yet it is enormously to the advantage of American business to undertake it. Fortunately, there is a representative group sponsored by industry, The Committee for Economic Development, which has for some time been working intensively upon the problem, and which is excellently equipped to offer sound and progressive advice. It should be used for this purpose.

American business cannot afford to take a negative attitude toward legislation in this field. Some legislation undoubtedly will pass, for the problem is one in which there is a grave government responsibility. But equally there is a comparably important responsibility upon all citizen groups. None of them has more to gain or lose from the rise or fall of prosperity than American business.



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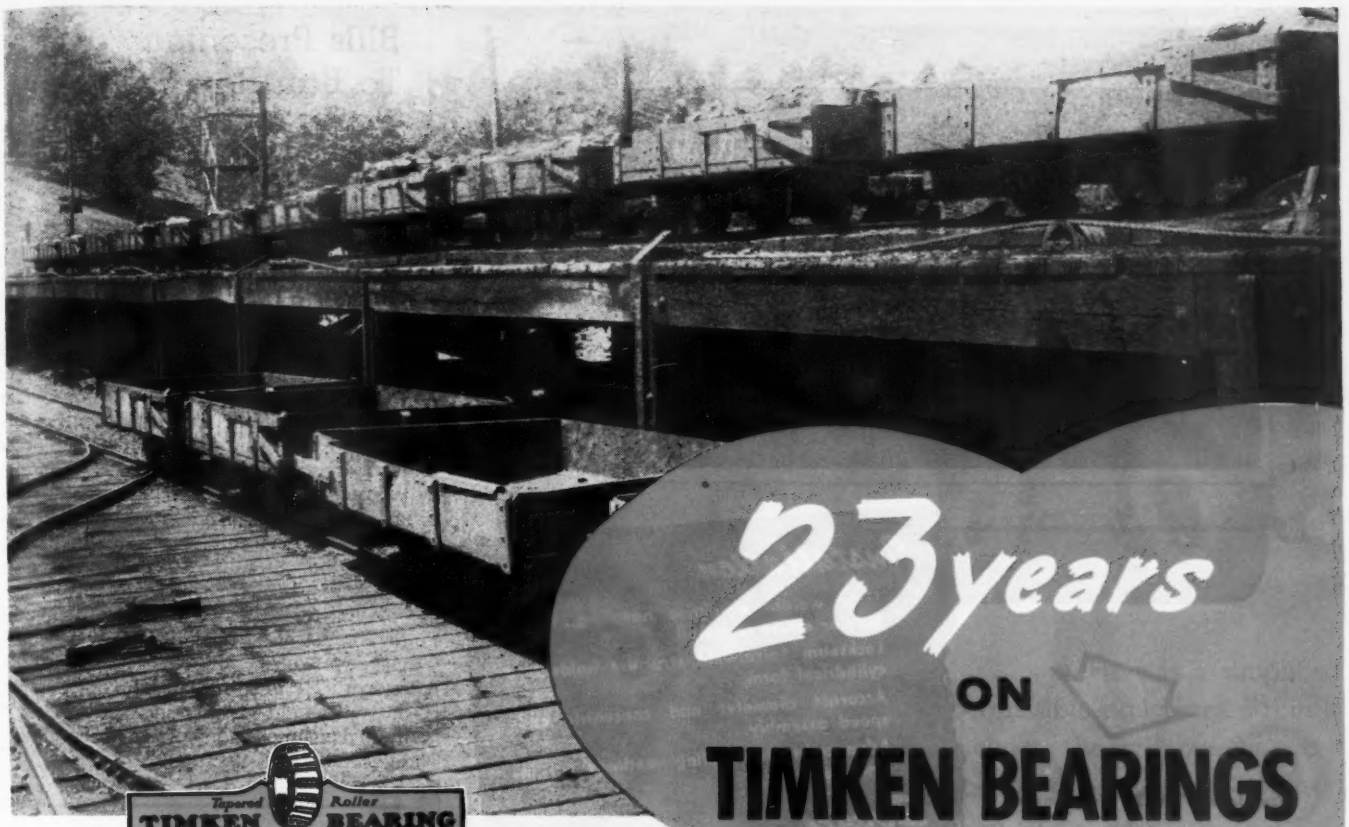

23 years ON TIMKEN BEARINGS without a single bearing replacement!

Where "Timken Bearing Equipped" mine cars work, lowered operating costs and a consequent increase in profits invariably results. Convincing confirmation of this fact is found again in the experience of The New River Company of Mount Hope, West Virginia, who are one of the largest producers in the New River Smokeless field.

At their Sprague Mine on the outskirts of Beckley, W. Va. 175 car sets of Timken Bearings have been operating continuously for 23 years without a single bearing failure. So gratifying has been this enviable performance record, they now have more than 4000 cars in constant operation and rolling on Timken Bearings.

This is typical Timken Bearing performance and the reason they are preferred by the mining industry. Operators everywhere know that Timken Bearings mean greater tonnage hauls at faster train speeds with less power consumed. They know, too, that there'll be less wheel breakage, simplified economical lubrication and greatly reduced maintenance and they insist on these advantages. You, too, can enjoy these benefits by being sure the trade-mark "TIMKEN" is on every bearing you buy. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

No other light-weight pipe offers mine operators the performance of

NAYLOR PIPE

Installation

Light weight simplifies handling, makes Naylor easier to install.

Lockseam Spiralweld structure holds true cylindrical form.

Accurate diameter and concentric ends speed assembly.

Advanced-type coupling methods cut installation time.

Service

Exclusive structure produces stronger, leak-tight, safer pipe.

Safety feature absorbs shock loads, vibration, expansion and contraction.

Naylor Pipe handles jobs normally requiring heavier-wall pipe, thus saving steel.

Economy

Light weight cuts shipping and handling costs.

High salvage and re-use provides substantial savings.

Sizes from 4" to 30" in diameter. Thickness from 14 to 8 gauge. Lengths up to 40 feet. All types of fittings, connections and fabrication.

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Bills Presented To Ban Royalties

A bill to prohibit royalty payments to labor unions was presented in the Senate at Washington in mid-March by Senator Josiah W. Bailey (D., N. C.). He said he introduced it because of John L. Lewis' demand on the coal operators and James C. Petrillo's 5c. a record royalty agreement obtained for the American Federation of Musicians.

The measure provides that, except for the check-off of union dues and other normal operating practices of labor unions, "it shall be unlawful for any representative or agent of any such employees who are engaged in commerce or in the production of goods for commerce to demand, receive, or accept, from the employer of such employees, any money or other thing of value, for the use of such representative or in trust or otherwise."

A bill presented in the House March 28 by Rep. A. L. Miller of Nebraska would make the collection of such royalties a felony. He also introduced a measure to outlaw the closed shop and dues check-off by making such labor practices illegal and subject to penalties.

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Feb. 1 1945	P.c. Change From Jan. 1 1945	P.c. Change From Feb. 1 1944
Electric power utilities	14,377	−11.8	+3.7
Byproduct coke ovens	5,692	−6.9	−7.7
Steel and rolling mills	666	−5.0	−11.4
Railroads (Class I)	11,311	−12.4	+22.8
Other industrials*	14,357	−12.6	−21.2
Total	46,403	−11.6	−38.2

Bituminous Coal Consumption

	Thousands Net Tons Jan. 1945	P.c. Change From Dec. 1944	P.c. Change From Jan. 1944
Electric power utilities	7,327	+3.7	+1.0
Byproduct coke ovens	7,933	−0.6	−1.1
Steel and rolling mills	1,078	+5.5	+5.7
Railroads (Class I)	12,011	+2.2	−0.3
Other industrials*	14,633	+4.7	+2.6
Totals	42,982	+2.8	+0.8

* Includes beehive coke ovens, manufactured-gas plants and cement plants.

Bituminous Production

February, 1945, net tons	46,900,000
P.c. change from February, 1944	−11.2
January-February, 1945, net tons	99,100,000
P.c. change from Jan.-Feb. 1944	−7.0

Anthracite Production

February, 1945, net tons	4,418,000
P.c. change from February, 1944	−24.7
January-February, 1945, net tons	8,613,000
P.c. change from Jan.-Feb., 1944	−20.9

Sales of Domestic Stokers

January, 1945	5,091
P.c. change from Dec., 1944	+5.0
P.c. change from Jan., 1944	+252.9

Index of Business Activity*

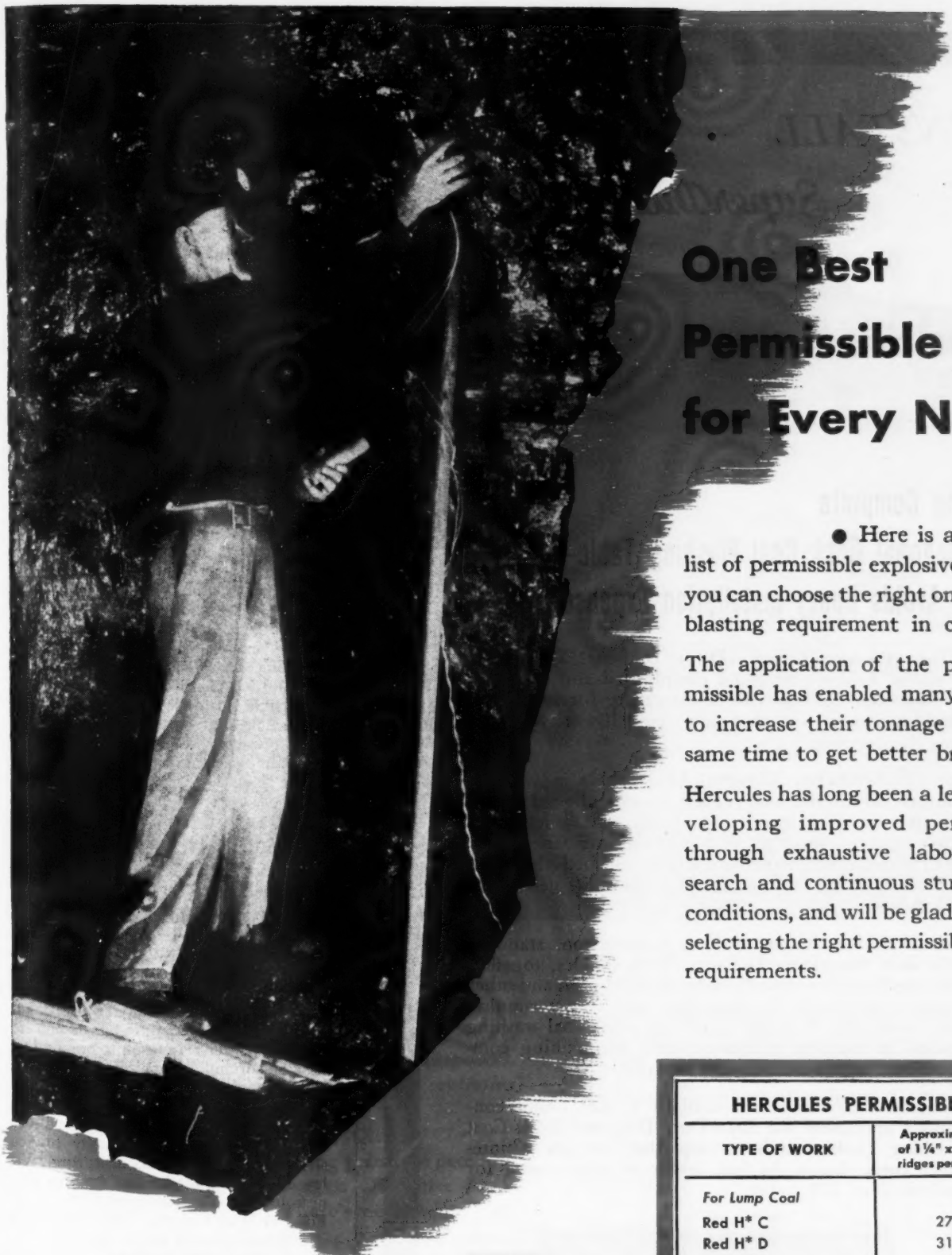
Week ended March 24	233.0
Month earlier	231.7
Year earlier	237.9

**Business Week*, March 31.

Electric Power Output†

Week ended March 24	4,401,716,000
P.c. change from month earlier	+0.6
P.c. change from year earlier	−0.2

† Edison Electric Institute.



One Best Permissible for Every Need

● Here is a simplified list of permissible explosives. From it you can choose the right one for every blasting requirement in coal mines.

The application of the proper permissible has enabled many operators to increase their tonnage and at the same time to get better breakage.

Hercules has long been a leader in developing improved permissibles, through exhaustive laboratory research and continuous study of field conditions, and will be glad to assist in selecting the right permissible for your requirements.

HERCULES PERMISSIBLES

TYPE OF WORK	Approximate No. of 1¼" x 8" Cartridges per 100 lbs.
For Lump Coal	
Red H* C	276
Red H* D	316
Red H* F	356
For Rock or Fine Coal	
Red H* B	280
Collier* C	320
For Wet Work	
Hercogel* A	200
Hercogel* 2	240

HERCULES

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HERCULES POWDER COMPANY
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936 KING STREET
WILMINGTON 99, DELAWARE

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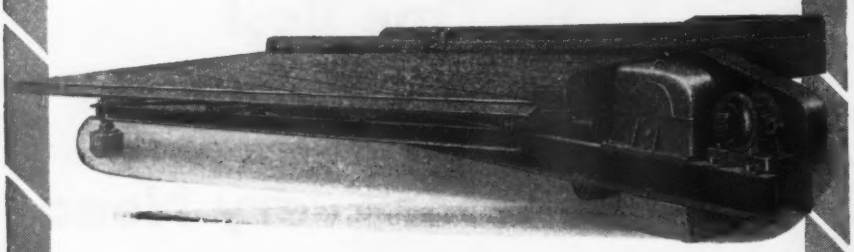
XP-52

INSTALL

SuperDuty



The Complete Diagonal Deck Coal Washing Table— It Avoids Heavy Installation Expense

When you install SuperDuty Diagonal Deck Coal Washing Tables, you avoid complicated and expensive foundations. You obviate any necessity for subsequent blocking, bracing or other corrective millwork to obtain smooth operation.

For the SuperDuty Diagonal Deck Table is *complete* and easy to install, with rugged, factory aligned underconstruction an integral part of the unit. Field facts prove that you incur no post-installation worries, since this pre-determined, permanently established alignment — built in at the factory for you — prevents deck warp and flutter.

This exclusive design of underconstruction, standard only with SuperDuty Diagonal Deck Tables, together with the Concenco Anti-Friction Head Motion and other features, results in the smoothest and easiest running table ever built. It easily excels any other coal washing process in cleaning efficiency while maintaining comparable or higher washed coal capacity.

Economical to run at substantially 1 H.P. under continuous operation, the SuperDuty Diagonal Deck Coal Washing Table also is not equalled for low maintenance costs. Learn the full details at once — send for Bulletin No. 119 today.

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★ The ORIGINAL Deister Company ● Inc. 1906

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in February, as follows:

Goodman Mfg. Co.—Type 115 Conway shovel; two motors, 15 and 7½ hp.; 440 volts, a.c.; Approval 525A; Feb. 5.

Goodman Mfg. Co.—Type 125 Conway shovel; 25-hp. motor; 440 volts, a.c.; Approval 526A; Feb. 28.

Supreme Court Hears Travel Time Argument

The United States Supreme Court heard arguments March 9 in the Jewell Ridge portal-to-portal case. Crampton Harris, who represented the miners, asserted there was no question to consider because the issue had previously been decided in the Alabama iron-ore case.

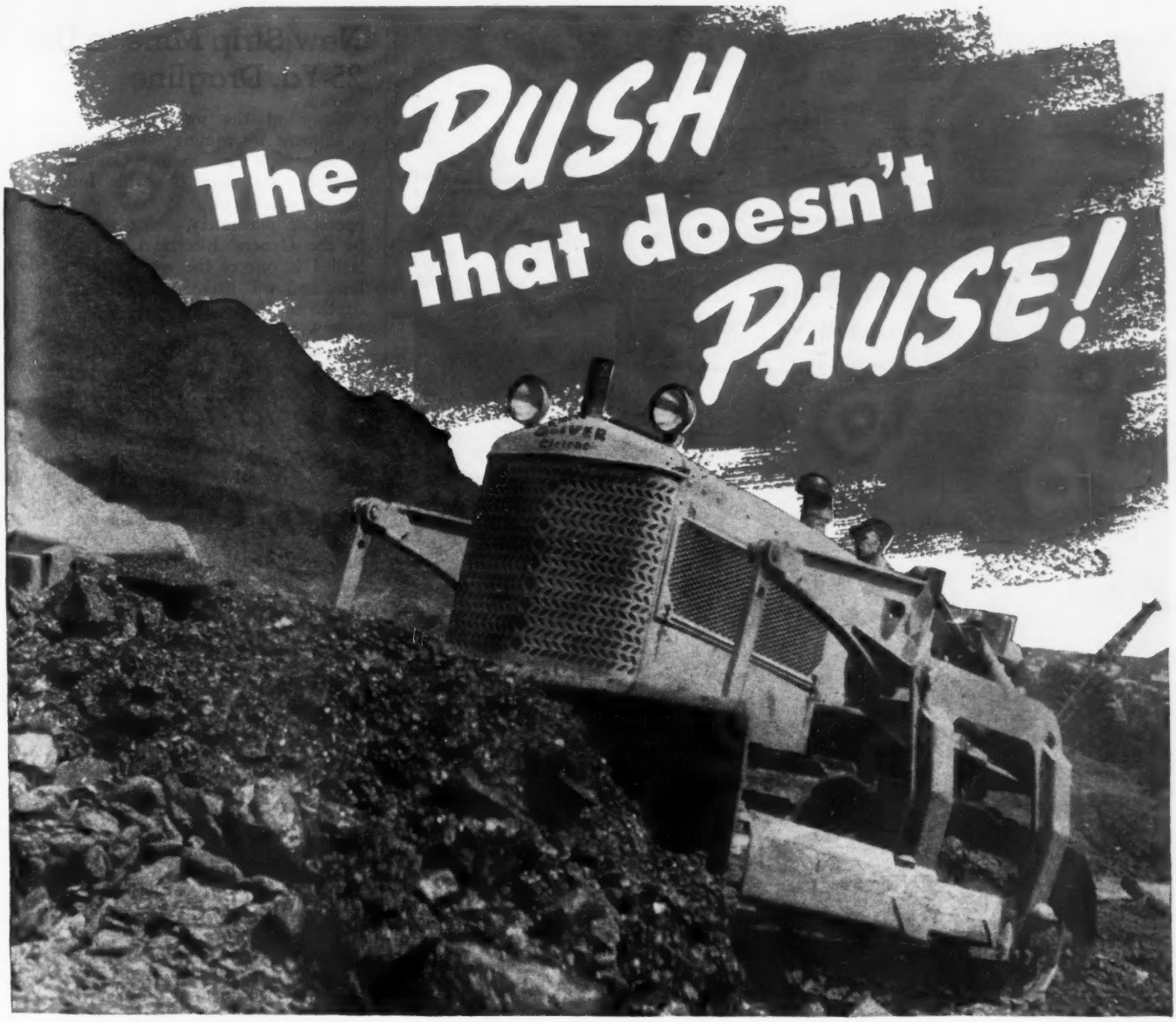
George Richardson and William A. Stuart, counsel for the Jewell Ridge Coal Corp., closely followed their argument in the Southern Coal Operators' Association, amicus curiae, filed by Edward R. Burke and John C. Gall, stressing the ruling of the District Court in Virginia and the War Labor Board's statement in 1943 that "the whole economic structure of the bituminous mining industry has been built upon the payment of wages on the 'face-to-face' basis."

•

3 Roads Race to Open New Virginia Field

Three major railroads are racing to determine which shall reach about 150,000 acres of untouched Wise and Dickenson county (Virginia) coal tonnage. The Carolina, Clinchfield & Ohio, the Atlantic Coast Line and the Louisville & Nashville have applied to the Interstate Commerce Commission for permission to build a 14.5-mile line from Fremont into the central and western part of Dickenson County. Since then the Chesapeake & Ohio, grouped with the Nickel Plate and Pere Marquette, has asked authority to construct a 13-mile extension of its Sandy Valley & Elkhorn subdivision from a point near Jenkins, Ky., southeasterly to Meade Fork, in Wise County. The Commission had already granted the C. & O. the right to intervene in the C. C. & O. application to extend its lines farther into Dickenson County.

I.C.C. has denied a certificate for construction by the Chicago, St. Louis & New Orleans Ry., and operation by the Illinois Central, of a line in Muhlenberg County, Kentucky. As I.C.C. had previously approved an application by the Louisville & Nashville for authority to construct a line to serve the same mines as were to be served by I.C., it was decided that construction by the latter "would result in an unnecessary duplication of railroad facilities."



They keep pushing! That's why Oliver "Cletrac" tractors move heavier loads . . . faster . . . more economically. Both tracks keep working all the time . . . on the turns as well as straightaway. There's no pause in the flow of pushing power. For only Oliver "Cletrac" gives you *controlled differential steering.*

On any job, push or pull, Oliver "Cletrac's" controlled differential steering principle provides these outstanding advantages. Off-center loads are handled with ease. There's no need to "declutch" or "brake" when turning, providing greater safety on hills and slopes. Oliver "Cletracs" don't zig-zag. They steer the same going downhill as up. Power is never disconnected from either track.

These husky tractors offer other equally important features. And because they are unusually accessible, maintenance is a simple task.

Substantial numbers of Oliver "Cletrac" tractors are now being released for essential use. Your Cletrac dealer will gladly assist you in making application for a new tractor.

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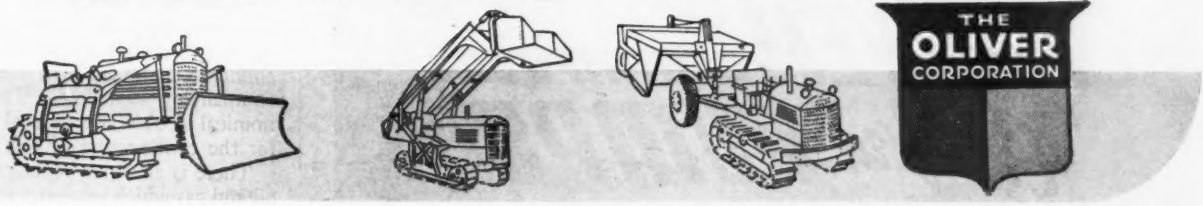
OLIVER - Cletrac



...for the Mining Field

LOW first cost, fast priming, efficient, non-clogging action mean that Carver Pumps get to work faster, stay on the job longer, and pump more water at less cost per gallon. Top capacity is maintained even after hundreds of hours of toughest service because the wearing surface seal rings are made of Tungsten Carbide that will keep water in and air out.

Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. It's your assurance of peak performance on your toughest jobs as well as on the easy ones. For details, see your nearby Carver distributor or write direct.

THE CARVER PUMP CO. .
Muscatine, Iowa

CARVER CENTRIFUGAL
Certified **PUMPS**

New Strip Mine to Use 25-Yd. Dragline

Some of the most powerful electric equipment for mining ever constructed is to be used at the Maumee Collieries Co.'s new strip mine near Jasonville, Ind. Totaling the equivalent of about 7,000 hp., this operating machinery, being manufactured by the General Electric Co., will be installed in one of the world's largest draglines and will make possible operation at depths of 40 to 70 ft.

Included in the electric equipment is the largest type of amplidyne control, while two heavy-duty multi-unit motor-generator sets arranged for variable-voltage operation supply power for main motions. The Bucyrus-Erie dragline which it will operate can dig 140 ft. deep and can dump about 360 ft. from where it digs. It will have a 25-yd. drag bucket on a 180-ft. boom and the combined weight of bucket and full load will be 130,000 lb. Weight of the machine is 2,410,000 lb.

Open-pit operations at the new mine are expected to begin about Sept. 1, according to Hugh B. Lee, vice president and general manager of Maumee Colleries Co. To be known as Linton Mine No. 28, it will have a monthly capacity of 60,000 tons.

•

Fuel Problems Detailed At Preparation Meet

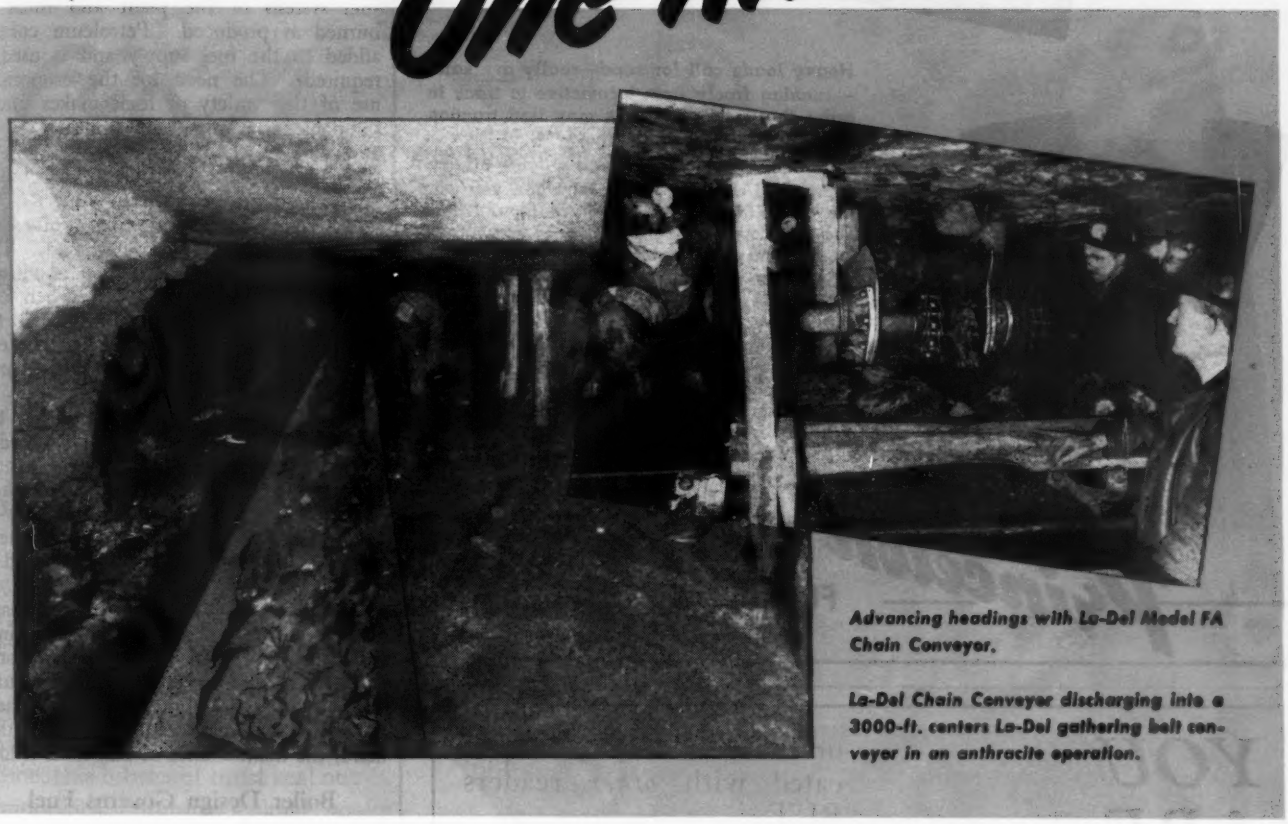
Through two of its engineers, the Shell Oil Co. presented its fuel problems at a recent meeting of the Illinois Society of Preparation Engineers and Chemists at the Benton Country Club, Benton, Ill. The speakers were G. N. Andrews, manager of the utilities department, and C. A. Davidson, fuels coordinator.

The Wood River plant is the largest of three Shell refineries in the middle western United States. It has a capacity of 90,000 bbl. of crude oil per day. It employs about 3,500 men, 100 of whom are in the utilities department. That department furnishes steam, electric power, compressed air and water on a continuous 24-hour 7-day week basis.

There are seven different types of direct-fired steam boilers, including one under construction, designed to generate 1,450,000 lb. of steam per hour. The electric load has a 24,000-kw. peak with a 90-percent load factor and power factor. Heretofore, all electric power has been purchased. A 6,250-kva. General Electric steam turbo-electric generator, placed in regular operation Jan. 15, is the first of four such units which will finally take over most of the load. They take steam at 600 lb. per square inch and 750 deg. F. at the throttle and exhaust at 180 lb. for processing purposes. The cycle generates 1 kw.-hr. of electric power for 3,600 B.t.u. as against a typical average of 13,500 B.t.u. (1938) for central stations, which must condense steam at high vacuum with accompanying heat loss. This highly economical double use of coal is one reason for the construction of this power plant.

There is an older boiler plant fired with oil and gas which generates steam at 150 lb.

Two Questions- One Answer



Advancing headings with La-Del Model FA Chain Conveyor.

La-Del Chain Conveyor discharging into a 3000-ft. centers La-Del gathering belt conveyor in an anthracite operation.

LA-DEL Has the Answer to YOUR Production Problems

Every mine operator is looking for the answers to these two important questions: How can I meet today's increased production demands? How can I best prepare for tomorrow's competitive markets? Alert operators realize that the one answer to both these questions is Mechanized Mining. And when mechanized mining means moving coal underground, that answer is, specifically, La-Del. Records show that wherever conditions indicate use of chain conveyors, La-Del Underground Chain Conveyors are the logical choice of leading operators everywhere.

Precision-built to exacting standards, La-Del Chain Conveyors provide a continuous flow of coal from the face that will increase tonnage and reduce production costs. They are easily moved, quickly installed and will work equally well with hand or mechanical loading—vital factors to trouble-free, low-cost operation.

LA-DEL EQUIPMENT INCLUDES . . .

Belt Conveyors—Shaker Conveyors—Elevating Heads—Pit Car Loaders—Mobile Loading Machines—La-Del Trolley Mine Ventilating Fans and Blowers—And La-Del Experienced Engineering Counsel—Before and After Installation.

Buy More War Bonds—And Keep The Bonds You Buy!

MATERIAL HANDLING LA-DEL MINE VENTILATION

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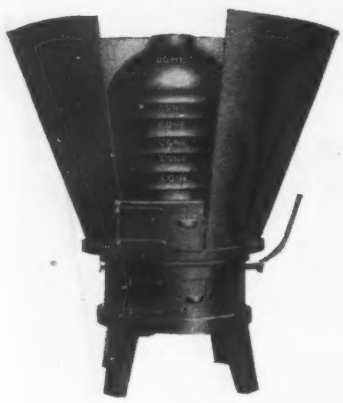
LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

DRY SAND will help you haul more coal per trip!



Heavy loads call for *sand*—really dry sand—running freely from locomotive to track in order that driving wheels may find traction and develop pulling power.

You can depend on having plenty of dry sand, at HALF the usual cost when you use the "PERFECTION" Cone Stove Sand Drier. The standard size dries 8 to 10 tons in 8 hours—and we can increase the size of the same drier up to 12 to 14 tons capacity. Let one of these units prove itself in your operations.

Write today for complete information on this and other Princeton products. Our facilities include Pattern Shop, Machine Shop, Grey Iron and Bronze Foundries for the manufacture of a wide variety of mining parts and accessories.

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The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. With our NEW ROPE SEAM SUSPENSION it can be put up or taken down in a fractional part of the time required by other means of face ventilation.

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ST. LOUIS, MO.

for direct steam drives and for processing. Considerable processing steam is condensed and returned to the boilers as feed water.

Scattered about the plant are 75 processing furnaces, consuming variously from 14 million to 210 million B.t.u. per hour each and totaling 26.5 billion B.t.u. per hour. In the refining processes, 30,000,000 cu.ft. of 1,400-B.t.u. gas is produced daily. Except for that portion which is bottled and sold, it is all collected into the fuel system of the plant and must be burned as produced. Petroleum coke is added to the fuel supply and is used as required. The need for the economical use of this variety of fuels makes understandable the important function of an office of fuels coordinator.

While oil also is available for boiler-house fuel, the policy is to limit its consumption to periods of coal shortage or failure of coal-handling equipment. This contributes to the conservation of oil and consequent delay of the day when coal must be hydrogenerated to supplement the nation's natural oil supply. To that end the tonnage of coal used at this plant may be ultimately doubled or tripled.

Pulverized coal is used for firing the main steam-power plant. It is purchased as 1¼- or 1½-in. screenings, delivered in hopper-bottom cars, conveyed to the boiler area and lifted by a Redler-type elevator to bunkers of 1,100 tons capacity. Magnetic separators remove the tramp iron ahead of the grinding mills.

Ten boilers have Riley impact-type hammer mills and two are fed from Hardinge tube-type ball mills. Ball mills are more expensive to install than hammer mills and the power required to drive them under light load is excessive. On the other hand, the maintenance of ball mills is low.

Boiler Design Governs Fuel

The specific design of individual boilers governs the coal to be burned in them. Two high-pressure boilers operate very satisfactorily with central Illinois coal having an ash fusion temperature of 2,000 to 2,100 deg. F., while two others of a different type designed to meet identical specifications, slag considerably with the same fuel. Excess air helps to reduce slag formation at the expense of efficiency. Eight boilers built in 1925, and converted in 1937 for firing pulverized coal or petroleum coke screenings, now operate at 300 to 350 percent of design ratings with southern Illinois coal having an ash fusion temperature of 2,250 to 2,500 deg. F.

The high-pressure boilers are all equipped with slag screen tubes at the furnace outlets. All boilers are operated near full load. If capacity were available to operate at 10 percent lower load, excessive slag would largely disappear because of lower furnace temperature. Coal research in the line of chemical treatment to moderately raise or lower ash fusion characteristics would be an invaluable contribution to industrial coal utilization.

Another problem is the disposal of fly-ash. Under conditions at this plant, 80 percent of ash material leaves the boiler with the flue gas and 20 percent drops into the ash hopper. Fly-ash collectors remove most of the ash from the flue gas before it reaches the stack. Roughly 50 tons per

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THROUGHOUT your busy plant, there are hundreds, perhaps thousands, of grease-lubricated ball bearings like the one shown at the right.

As you know, their efficient operation depends largely upon a grease that continuously covers the highly polished surfaces and provides strong films for protection against wear, rust and corrosion. At the same time, this lubricant must seal out impurities, minimize leakage, make frequent re-packings unnecessary.

Today, in thousands of U. S. plants, Gargoyle Greases BRB, are providing this maximum protection. They are outstanding for their stable structure and their resistance to oxidation and separation over long periods in service.

Get Gargoyle Greases BRB, and be sure your ball bearings have the best body-guards you can buy.

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1. Lubrication Study of Your Entire Plant
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5. Progress Reports of Benefits Secured

Manganese Steel Renewable Lip Dippers *Give 60% Greater Service Life* Over Welded Type

The 17 yd. Amsco manganese steel renewable lip dipper for a Bucyrus 750-B coal stripping shovel shown in picture R-866 replaced an all-welded dipper at a Midwestern coal stripping operation. This is one of six Amsco dippers now in use by this coal company. All of them replaced welded dippers. Picture C-522 shows a 15 yd. Amsco dipper on a Marion Model 5480 electric stripping shovel at work at the same mine.

The stripping at these mines imposes severe service on the dippers, as the overburden contains considerable rock. The all-welded dippers previously used lasted about three years in this service. Amsco dippers which have been in similar service for seven years appear likely to last much longer.

In stripping operations, Amsco dippers last longer because austenitic manganese steel has the strength to resist heavy pressures and impact which are multiplied by high speed operation. There is sufficient metal at points of abrasive wear to insure good wearing life. Manganese steel work-hardens in service, presenting an abrasion-resistant surface.

The Amsco dipper pictured in R-866 weighs 46,500 pounds. The change from all-welded dippers was made without increase in weight, despite the weight-saving qualities of welded fabrication. In the Amsco renewable lip dipper the shovel capacity has been maintained by reducing dipper weight while retaining size, and yet without sacrificing strength, rigidity or long life. This is made possible by the incomparable toughness and wear resistance of manganese steel, plus advanced dipper design.

Ask for Bulletin 641-D on Amsco dippers and dipper parts.

Build-up and hard-surfacing welding of dipper lips and teeth described in Bulletin 941-W.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

day of fly-ash is pumped through a 4-in. pipeline to nearby lowlands.

The freezing of coal in the cars is a severe seasonal problem. Investigations in the St. Louis area indicate this difficulty is common with all large coal consumers. Thoroughly practical mechanical and chemical means of facilitating the unloading of frozen coal require much further development.

There are some interesting facts about petroleum coke. Its heating value is close to 15,000 B.t.u. per pound as fired. Ash usually is less than 1 percent, but fly-ash plus unburned fuel may equal the quantity of fly-ash from coal (approximately 8 percent of fuel fired) if burned in furnaces designed for coal. To use petroleum coke efficiently for steam generation, the boiler furnace must be modified. Furnace temperatures must be raised to promote ignition and efficient combustion and pilot lights are ordinarily required (V.C.M. less than 15 percent). No difficulty has been noted at Wood River with slag formation, but this statement is not applicable to all petroleum coke, since the refining process conditions affect fusion temperature of ash. This coke pulverizes readily, having a grindability of 123.

"Research With Experimental Coke Ovens" was discussed by Howard Jackman and Dr. G. R. Yohe, Illinois State Geological Survey, in an illustrated talk in a later session of the society. In January 1944, the Survey put into operation an experimental slot-type electrically heated coke oven with a capacity of 500 lb. for investigating the suitability of Illinois coals for making metallurgical coke. More than 100 test runs have been made.

To date, the higher grades of washed coal, containing less than 1 percent sulphur, have been used in these experiments. Resulting coke has tallied very closely with coke made from similar blends of coal in commercial ovens. Enough runs have been made to prove that commercial results can now be predicted from pilot runs made in the experimental oven.

Illinois coals are being blended with eastern coals for making blast-furnace coke in Chicago and Granite City. Coke made in Koppers ovens from blends up to 65 to 75 percent of Illinois coal is being used in the Granite City blast furnaces.

Although there are no recognized specifications for metallurgical coke, the raw coal that goes into it must be up to certain standards for best results. Fine sizes (approximating minus $\frac{3}{8}$-in.) are excluded to keep down moisture and oxidation as well as to eliminate fusain. It is very important that the banded ingredients, vitrain, durain and clarain, be thoroughly blended and the ash content uniform. While washed coal is used largely because of its low sulphur, surface moisture is detrimental to the quality of the coke. The blend of different coals must be such as will limit expansion pressure in the oven.

Mr. Jackman pointed out that Illinois coal producers have much to learn about producing a satisfactory coal for making metallurgical coke, that byproducts from Illinois coals are not equivalent to those from eastern coals and that further research is needed to determine how some of the details may best be handled.

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TROUBLE . . .

The Leveler of men!

You cannot prevent the occurrence of Trouble, in the form of accidents, disabling illness or death to your employees or to their dependents . . .

But you can provide the means, the MONEY WHEN NEEDED MOST, to your people when these emergencies strike fear of financial ruin into their souls.

YOUR EMPLOYEES AND YOUR PLANT, TOO, WILL BENEFIT BY THE FRIENDLY PROTECTION OF PROVIDENT'S

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NOW PROTECTING MORE THAN 1,000,000 WORKERS AND THEIR DEPENDENTS

Strip License Bill In Illinois Assembly

Strip mines would be licensed and taxed, to provide funds to restore the surface, by the terms of a bill introduced in the Illinois Assembly by Rep. Paul Powell (D., Vienna) and referred March 7 to the House Judiciary Committee. The measure calls for a $500,000 appropriation.

The measure, H.B. 210, levies a tax of 4c. per ton on strip-mined coal in the State after Sept. 1, 1945; requires persons engaged in strip mining to obtain a certificate from the Department of Mines and Minerals after that date and to file a surety bond with the department conditioned upon compliance with the act; requires each operator to file annually with the department a statement showing the tonnage mined by him during the preceding year; sets forth grounds on which the department may suspend or revoke certificates issued by it and provides for judicial review of decisions of the department. Moneys derived from the tax are to be paid into the strip-mining funds in the State Treasury, and shall be used to restore the topography of the land where such operations have been conducted.

•

A.C. Distribution Meeting Theme

A.c. distribution problems at mines was the subject of March meeting of Mining Electrical Group, held at West Frankfort Country Club, West Frankfort, Ill. R. M. Ryan, senior industrial engineer, General Electric Co., Chicago, was the speaker.

Mr. Ryan listed the factors in distributing power to the working faces of the mine as: (1) adequate voltage; (2) carrying capacity of wires; (3) keeping losses within economical limits; (4) protection from surges.

The voltage used will depend on the devices to be driven. Standard motors carry a guarantee of service under a variation of plus or minus 10 percent from the rated voltage. But for some devices, as electronic tubes, voltage must be held to smaller limits—around plus or minus 5 percent. For that reason and because motor torque drops off with the square of the voltage, industrial plants should maintain voltage at plus or minus 5 percent of normal.

This may be accomplished by selecting high voltages for primary and secondary lines, by transformers equipped with load ratio control, by the use of load centers in the distribution layout or by voltage regulators, which may be set in tandem if necessary. If there is a choice available, that choice should be the highest consistent with the job and its cost for both primary and secondary lines. Line losses being inversely as the square of the voltage, this greatly reduces distribution losses. Load center layout cuts secondary losses in two. Transformer ratio control and voltage regulators may well be considered.

The wiring must have capacity to take care of the load without heating and must be large enough to limit the losses to an

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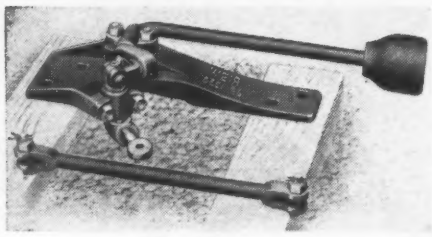
Sold Through Reliable Industrial Distributors Everywhere

SWITCH STANDS that CONSISTENTLY Prove Their Value in moving MORE COAL...FASTER

WEIR KILBY



Design 25—Parallel Throw

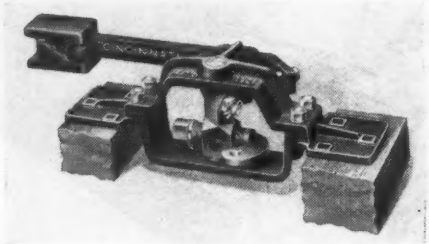
Design 25—An improved Parallel Throw Stand of simple construction and easy operation. The stand is low to give maximum clearance; parts are interchangeable and easily replaced. Adjusting arm permits easy change of throw from 3" to 5".

CHAMPION—Self-locking and non-automatic. The throw is adjustable by means of transferable shims which allow a variation of 1/8" and a range of 1".

Open Type Spring Rod

Enclosed Type Spring Rod

These switch stands furnished with either solid or spring connecting rods.



CHAMPION Parallel Throw

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economical figure. Voltages, transformer equipment, load centers and voltage regulators are all means by which voltage and power losses to the point of service may be satisfactorily controlled.

Line surges from short circuits, opening or closing of circuit breakers and lightning frequently raise the line voltage to several times normal. Energizing an unloaded line may double the voltage. Suddenly opening a line may do the same thing. Lightning discharges may raise the voltage to many times normal.

Relief from these transient phenomena may be had by lightning arresters, capacitors or combinations of these devices. Transformers may or may not protect secondary circuits from the effects of lightning. A metal-covered cable acts as a capacitor. Such a borehole cable may not protect itself, but if it is 400 or 500 ft. long it is excellent protection for the motor generator it feeds underground. The cable itself needs the protection of a lightning arrester.

For the protection of rotating equipment, a station arrester (thyrite) near the machine, a pellet arrester 1,500 ft. away and a 3-pole grounded capacitor attached to the machine terminals is the recommended practice. Such protection is effective.

The cost of electrical equipment depends to some degree on its voltage rating. It is necessary to use a voltage the utility has to offer. In any event a distribution system must be laid out on its merits.

•

Ease Draft of Men Under 30 in Coal

Moving to relieve the tight manpower situation in five essential war industries, Selective Service announced March 17 that coal mines, transportation, rubber, steel and non-ferrous metal industries would be permitted to retain indefinitely practically all their essential male workers under 30 years old. This relaxation of the plan to hold deferments of younger men in essential industries to not more than 30 percent was said to permit deferments of about 30,000 additional coal miners, according to the National Coal Association.

This modification of the general draft policy, as it applies to the five industries, was ordered upon the recommendation of a committee appointed by James F. Byrnes, Director of War Mobilization and Reconversion.

•

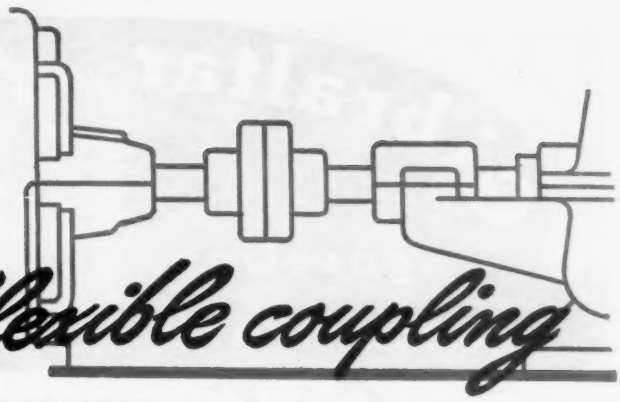
Personal Notes

CHARLES C. KEITH (D., Joplin) has been appointed chief mine inspector of Missouri, vice JOHN A. SKINNER (R., Webb City), resigned.

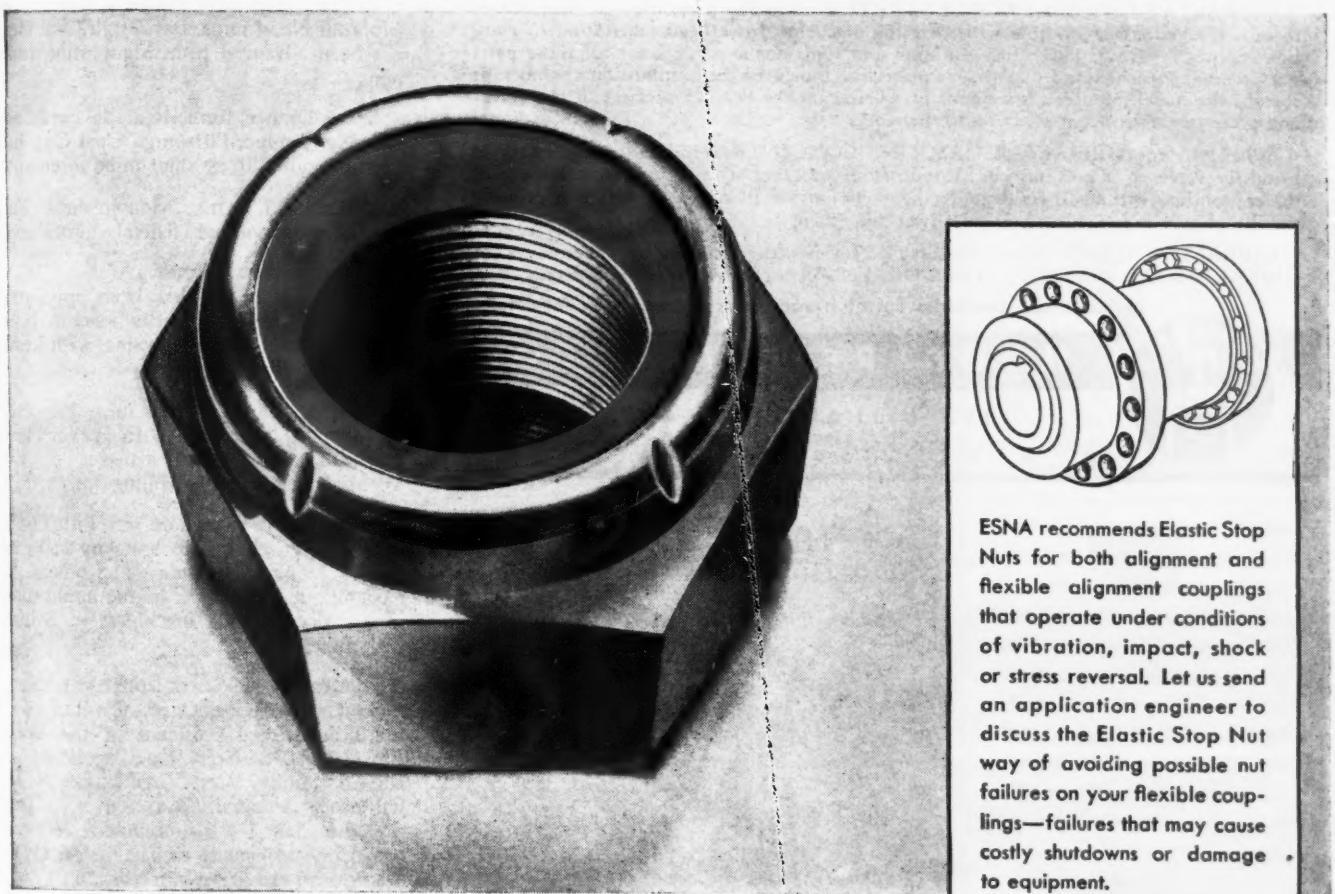
RAYMOND E. SALVATI, vice president and general manager, Island Creek Coal Co., has been chosen by Governor Clarence W. Meadows as member at large and chairman of the board of governors of West Virginia University.

NEJARD OKLAR has been appointed min-

IT'S THE NATURAL THING



— for a flexible coupling



ESNA recommends Elastic Stop Nuts for both alignment and flexible alignment couplings that operate under conditions of vibration, impact, shock or stress reversal. Let us send an application engineer to discuss the Elastic Stop Nut way of avoiding possible nut failures on your flexible couplings—failures that may cause costly shutdowns or damage to equipment.

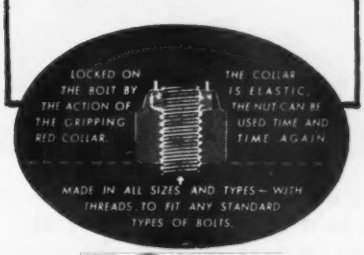
The Elastic Stop Nut uses its head. It has what it takes to stay put in a coupling, no matter how tough the operating conditions.

Built into the head of every Elastic Stop Nut is a locking device — an elastic compression collar.

This collar forms itself to the individual bolt thread, grips it tight. The nut won't loosen up or back off under conditions of severe vibration, shock or impact.

When you use Elastic Stop Nuts you need no cotter pins, no lockwashers or any other auxiliaries with their attendant increase in assembly and servicing costs. And you can turn them up to the torque you need and be sure they will stay there. No backing up or straining to find a cotter-pin hole. They can be used over and over again yet still lock. You can use them on any standard bolt.

Here is sure insurance against loose nuts which will result in reduced coupling maintenance costs.


LOCKED ON THE BOLT BY THE ACTION OF THE GRIPPING RED COLLAR
THE COLLAR IS ELASTIC. THE NUT CAN BE USED TIME AND TIME AGAIN
MADE IN ALL SIZES AND TYPES—WITH THREADS TO FIT ANY STANDARD TYPES OF BOLTS.

ESNA

TRADE MARK OF

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Sales Office—1060 Broad St., Newark 2, N.J.

ELASTIC STOP NUTS
Lock Fast to Make Things Last

KEEPS YOUR *Gasoline* EQUIPMENT OPERATING

GIBRALTAR GASOLINE CONCENTRATE used in the proportion of four ounces to each ten gallons of gasoline will solve the problem of overhead lubrication in gasoline engines. It lives through the explosion and functions as a lubricant for those parts not otherwise reached and deposits its protective film over the combustion chamber. It seasons the metal, reduces the amount of friction on the bearing surfaces of the valves and prevents carbon from adhering to them.

When you use GIBRALTAR GASOLINE CONCENTRATE it is not necessary to grind the valves as it prevents hard carbon from adhering. The savings from the use of the concentrate will at all times more than offset its small cost, and will also prolong the life of your motor, giving added power and efficiency.

GIBRALTAR GASOLINE CONCENTRATE is manufactured by the makers of GIBRALTAR OIL and DIESEL FUEL OIL CONCENTRATE. Write for details.

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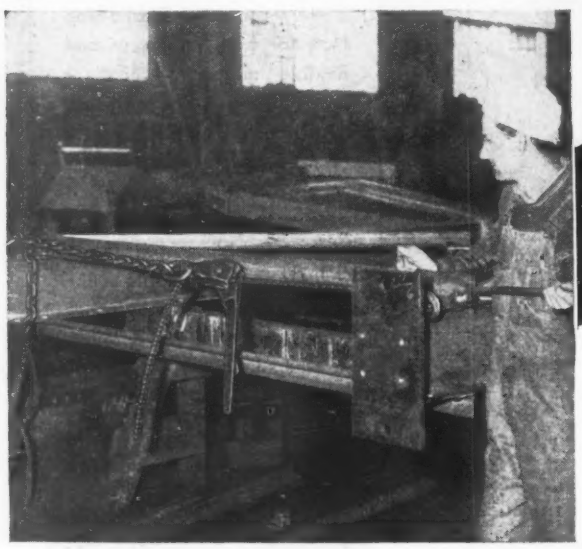


A HOIST TO FIT THE JOB

Coffing "Safety-Pull" ratchet lever hoist pulling I beams together for lining up holes to bolt bracing cross member in place.

To do the toughest jobs in a structural steel plant and do it quickly and safely a hoist or "puller" must be able to take brutal punishment hour after hour and for economy must give uninterrupted service month after month.

That is the job for a Coffing "Safety-Pull" ratchet lever hoist. The dual purpose hoist or puller with safety valve handle.

Write for Catalog No. JG-6

COFFING HOIST COMPANY

RATCHET LEVER HOISTS - SPUR GEAR HOISTS - ELECTRIC HOISTS
LOAD BINDERS - DIFFERENTIAL HOISTS - TROLLEYS

DANVILLE, ILLINOIS

ing engineer at the Garp Linyitleri lignite mine in Degirmisaz, Turkey. He was studying mining engineering at Freiberg Bergakademie, in Germany, when the war broke out, whereupon he came to the United States to continue his studies at the University of Pittsburgh, where he was graduated in 1942, receiving an M.S. in mining engineering.

THOMAS KMETZ, formerly assistant mine foreman at Banning No. 1 mine, Pittsburgh Coal Co., has been promoted to foreman.

ANDY POGACHANICK, formerly assistant mine foreman at Westland mine, Pittsburgh Coal Co., has been made general assistant there.

PETER DEGROSKY, formerly fireboss at Montour No. 4 mine, Pittsburgh Coal Co., has been advanced to assistant mine foreman.

MARK DENNY, formerly fireboss at Montour No. 9 mine, Pittsburgh Coal Co., has been promoted to assistant mine foreman.

WILLIAM I. IVILL, Monongahela, Pa., has been appointed federal bituminous mine inspector.

ALFRED J. NAIRN has been appointed State mine inspector in the Twelfth bituminous district of Pennsylvania, with headquarters at Punxsutawney.

JOHN A. SKINNER, chief mine inspector of Missouri, has resigned to become vice president and general manager of the Wentworth Mining & Milling Co.

HAROLD R. WHEELER, of Pittsburgh, Pa., has been elected an honorary member of the Mining Institute of Scotland in recognition of his work in the application of American mining machinery in British coal mines.

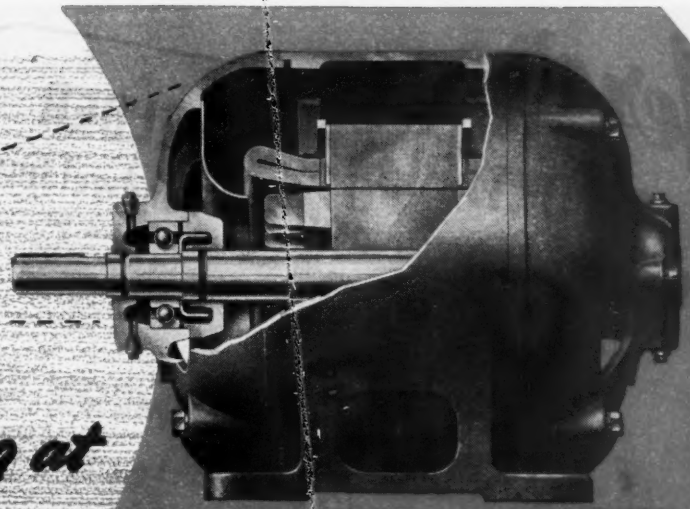
J. CAMPBELL STRAS, president, Kentucky Cardinal Coal Corp., Cardinal, Ky., has been elected president of the Weyanoke Coal & Coke Co., operating in Mercer County, West Virginia, vice R. D. Patterson, deceased. GEORGE F. MASH, superintendent, was promoted to vice president and general manager. HARRY E. COHN was elected a director.

•

New Aggregate Plant For Lehigh Nav. Co.

Plans for a new lightweight aggregate plant in the Panther Creek Valley of Pennsylvania costing about $700,000 are under way by the Lehigh Navigation Coal Co. Ground will be broken as soon as detailed plans are completed, according to Robert V. White, president.

The product, to be known as Lehigh aggregate, will be produced by utilizing the carbonaceous shale in the refuse material coming from the company's three breakers. It is estimated that about 125,000 tons of finished product will be obtained yearly. Experimentation and research have been conducted for a time and a pilot plant has been turning out the product for more than a year.



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A CUTAWAY VIEW OF A NEW TREND

in motor design

Two decades ago the purchaser of squirrel-cage motors had but one choice—the open motor. If operating conditions proved too severe, the only answer was to be found in frequent replacements.

Then came a period of new development in mechanical design, which resulted in the birth of dripproof, splashproof, totally-enclosed, fan-cooled, and a host of other new types, each designed for operation under certain adverse conditions.

But today there is a new trend—represented by Crocker-Wheeler Protected-Type Motors. These motors, besides having the surplus capacity of open designs, provide protection against many of the most common hazards encountered in operation. They may be used for many services for which enclosed and partially-enclosed motors have been specified in the past, *and yet, Protected-Type Motors cost no more than open motors.*

When and Where to Use Protected-Type Motors

WHERE THERE IS DRIPPING LIQUID
Because Protected-Type Motors are dripproof; falling water, oil, or other liquids cannot enter the windings. All ventilating openings are shielded.

WHERE THERE ARE FALLING CHIPS
Protected-Type Motors are ideal for machine tool and similar applications where metal chips and other foreign matter might injure the windings of less well-protected motors.

WHEN INSPECTION VISITS ARE FEW AND FAR BETWEEN
Because rotors are practically indestructible, stator windings are amply insulated, and ball bearings require attention only annually (sleeve bearings are optional), Protected-Type Motors call for minimum maintenance.

FOR ALL GENERAL-PURPOSE APPLICATIONS
Rated 40C rise, full-load continuous duty, with a 15 per cent service factor, these motors are suitable for all general-purpose applications. Mounting dimensions conform to N. E. M. A. standards.

FOR COMPLETE DETAILS, send for your FREE copy of this NEW four-page bulletin. Shows how these motors are protected; why they will give long trouble-free service. Write today — no obligation.

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Here's
A PORTABLE ARC WELDER
for faster easier repairs and Bondwelding
The G.M.C. Arc-Welder is ruggedly built to take abusive handling . . . can easily be moved from place to place, even in low coal. It's narrow, thus it's easy to load and unload and is equipped with flush sockets to prevent damage. Handles are placed away from coil heat, thus the unit can be moved as soon as each job is done. For more details write to
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These distributors can supply G.M.C. Equipment:
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QUICKER—LOWER COSTS
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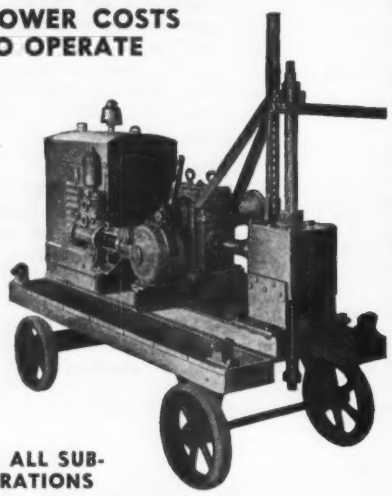

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ACKER DRILL CO.
SCRANTON 3, PA.

Anti-Pollution Bill Passes Penna. House

With bipartisan support, the Brunner anti-pollution bill passed the House in the Pennsylvania Assembly March 12, 177-24, and was sent to the Senate, where indorsement of rival party heads seemed to assure its enactment. The measure prohibits dumping of coal-mine silt into streams and boosts penalties for discharge of any industrial waste from $500-$1,000 to $100-$5,000 and not more than a year imprisonment.

Charles H. Brunner Jr. (R., Montgomery), sponsor of the bill, joined with Wilwood J. Turner (R., Delaware) in offering a supplemental bill to appropriate $5,000,000 for dredging 20,000,000 tons of silt from the Schuylkill River above Norristown.

To prevent anthracite silt from entering nearby streams, the Philadelphia & Reading Coal & Iron Co. has completed a silt-settling dam at its Brookside colliery, near Tower City, Pa. The breast of the dam is constructed from clay and rock to a height of 25 ft. Additional height will be provided as required.

•

Preparation Facilities

KANAWHA MFG. CO. (for West Gulf Coal Co., Maben, W. Va.)—Contract closed with Jeffrey Mfg. Co. for a single-compartment diaphragm jig to handle 85 t.p.h. of raw coal feed, size 5x⅜ in.

MUSKINGUM COAL CO., Zanesville, Ohio—Contract closed with Jeffrey Mfg. Co. for washing plant to handle 365 t.p.h. of raw coal feed, size 6 in. x 0.

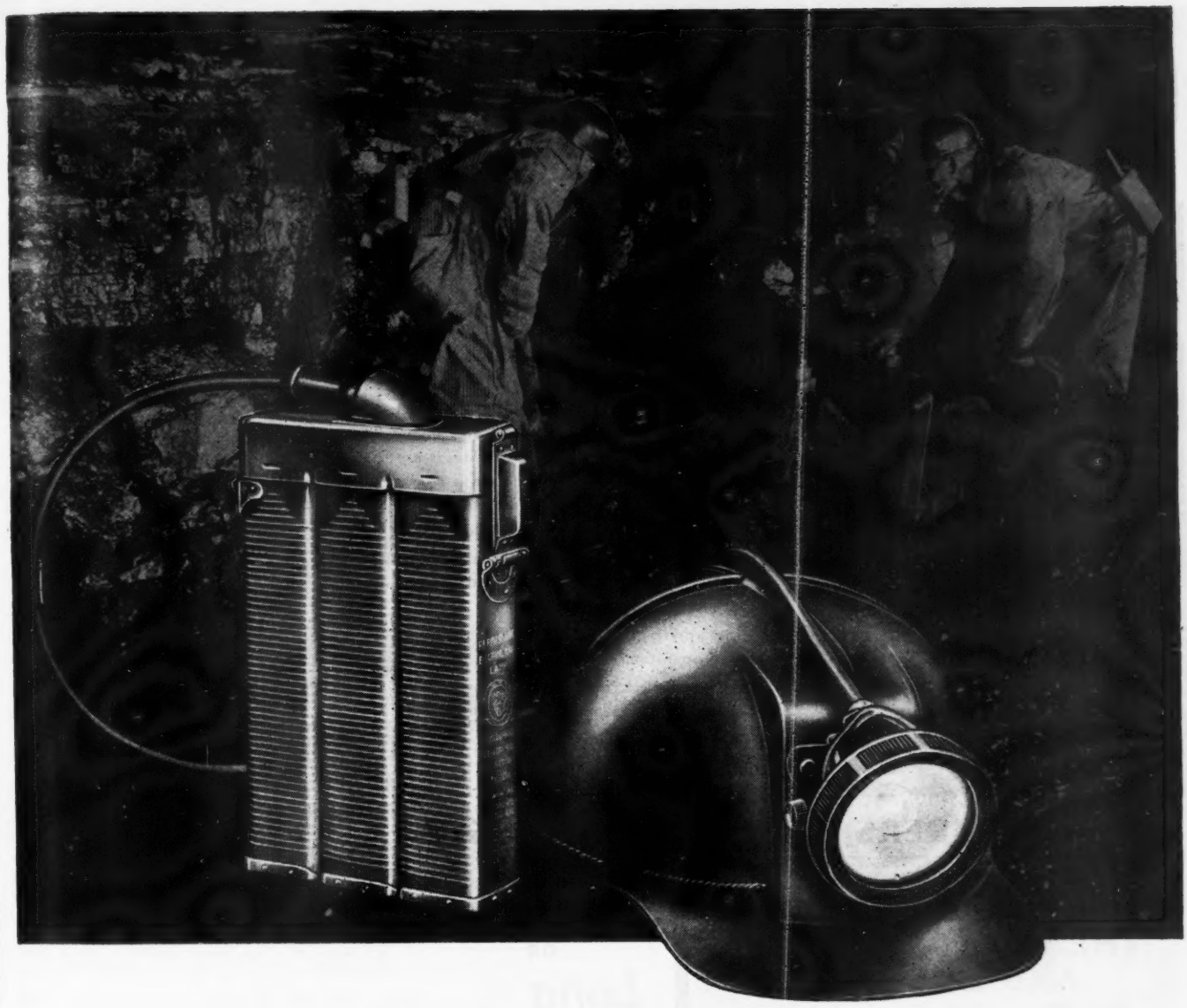
SLAB FORK COAL CO., Slab Fork, W. Va.—Contract closed with Kanawha Mfg. Co. for screening and loading equipment consisting of main shaker screens to handle 300 t.p.h., two Allis-Chalmers Ripl-flo vibrators for fine-coal screening, arrangement to make and load pea coal, mixing conveyors to reassemble mine-run and domestic mine-run on two tracks, and water-clarification system using concrete settling tank and recovery conveyors.

TUNNEL RIDGE COAL CO., Silver Brook, Pa.—Contract closed with Wilmot Engineering Co. for one 16-ft.-diameter Wilmot classifier to prepare No. 5 coal; feed capacity, 50 t.p.h.

•

Association Activities

INDIANA COAL OPERATORS' ASSOCIATION has elected as president C. N. Templeton, president, Glendora and Linton Summit Coal companies; vice president, Henry P. Smith, president, Black Hawk Coal Corp. and Princeton Mining Co.; commissioner and secretary-treasurer, Harvey Cartwright. The executive board includes W. M. Zeller, president, Knox Consolidated Coal Corp.; P. L. Donie, vice president, Little Betty Mining Corp.; David Ingle Sr., president, Ingle Coal Corp., and A. K. Hert, general manager, Snow Hill Coal Corp.



Protecting the MEN in Mechanized Mining

EDISON ELECTRIC CAP LAMPS

M. S. A. COMFO CAPS

The high productivity of America's mechanized mines is a tribute to efficient management—and to the highly-skilled workmen who man the machines. Vital to these miners are the safety factors of *better, more dependable light* and *proved head protection,* provided in top measure by the Edison Electric Cap Lamp and M.S.A. Comfo Cap—serving war's urgency in greater coal production, guarding the men on the job!

MINE SAFETY APPLIANCES COMPANY

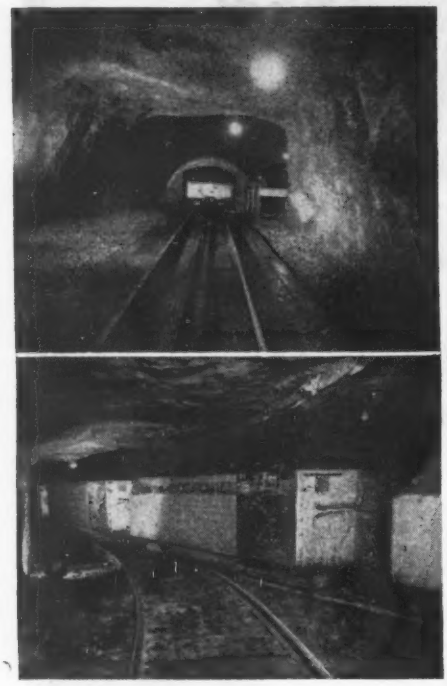
BRADDOCK, THOMAS AND MEADE STREETS

PITTSBURGH 8, PA.

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



MAINTENANCE COSTS ARE LESS

with "GUNITE" linings of roofs and sides of haulageways, slopes, entries and underground rooms.

"GUNITE" stops air slacking and eliminates most timbering. Roof fall hazards are minimized. The "GUNITE" surface is nearly white, resulting in much better visibility.

One inch of "GUNITE" is usually all that is needed but under particularly bad conditions it may be mesh reinforced and applied to a thickness of 2" or more.

The work can be done without hindering mining operations.

An application of "GUNITE" practically eliminates maintenance expense thereafter.

Write for our bulletin 2200, or better, let us drop in to discuss your problems with you.

MANUFACTURERS OF THE "CEMENT GUN"

It's Surprising How

THE RIGHT BEARINGS AND BUSHINGS

Cut Down Maintenance Cost!

Accent on Long Service

As specialists in bronze bearings and bushings for coal mining equipment we can cut your maintenance costs. Specific formulae for each application permits our money-back guarantee of superior service. Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

PROMET BEARING BRONZES

will not cut, or stick to the shaft under ordinary operating conditions, will not powder under severe conditions and, in emergencies, can be run without lubrication even at red heat, then suddenly cooled and returned to service without the least injuries to their properties. They can be machined at speeds of more than 500 feet per minute—more than double those of phosphor bronzes.

PROMET BAR STOCK

Cored or solid. Rounds. Hexagons. Squares. Rough cast. Semi-finished. Fully Machined. Cored stock in all sizes (by ⅛" steps) from a ½" minimum core to 12" O. D. and 12" lengths.

PROMET BRONZE CASTINGS

Any size, shape or section, up to 5000 lbs. ea., to your own patterns. Pattern making, designing and machining service when required.

PROMET MINE SPECIAL BABBITT FOR COAL MINE EQUIPMENT

It's different. Has a lead base and fine velvety grain. Will not score or cut even in case of lubrication failure. Withstands tremendous loads at high speeds.

The coefficient of friction is considerably less than that of tin base babbitts, therefore the loss of power and wear on the bearing and shaft are reduced.

Operates safely at temperatures which would be dangerously high with other babbitts.

PROMET THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
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Prompt deliveries can usually be made from stocks maintained at

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Limits Announced On "Fringe" Awards

Limits on the granting of "fringe" wage awards by the National War Labor Board were announced by Fred Vinson, Economic Stabilization Director, March 8 before leaving to become Federal Loan Administrator: The four fringe increases that WLB is authorized to make are: (1) vacation provisions up to one week after one year of service and two weeks after five years of service; (2) shift differentials in non-continuous operations not to exceed 4c. per hour for the second shift and 8c. an hour for the third shift; (3) merit increases and automatic progressions on a basis no more liberal than that embodied in the board's present standards; (4) reclassifications and job revaluations not to exceed an average increase for all employees in the particular plant of plants of 1c. per hour or 1 percent. Other non-basic wage adjustments or changes in working conditions affecting earnings remain subject to review by OPA as to their effect on prices.

•

Obituary

W. Gaston Caperton, 76, a pioneer in developing the southern West Virginia coal fields, died March 8 at his home in Slab Fork, W. Va. Chairman of the board of the Gaston Coal Co., Scotia Coal & Coke Co. and South Side Coal & Coke Co., he organized the Wright Coal & Coke Co., with his brother, in 1900.

Edward O'Neal, 47, superintendent of No. 3 mine of the Christopher Coal Co., Osage, W. Va., died March 2 of a heart attack.

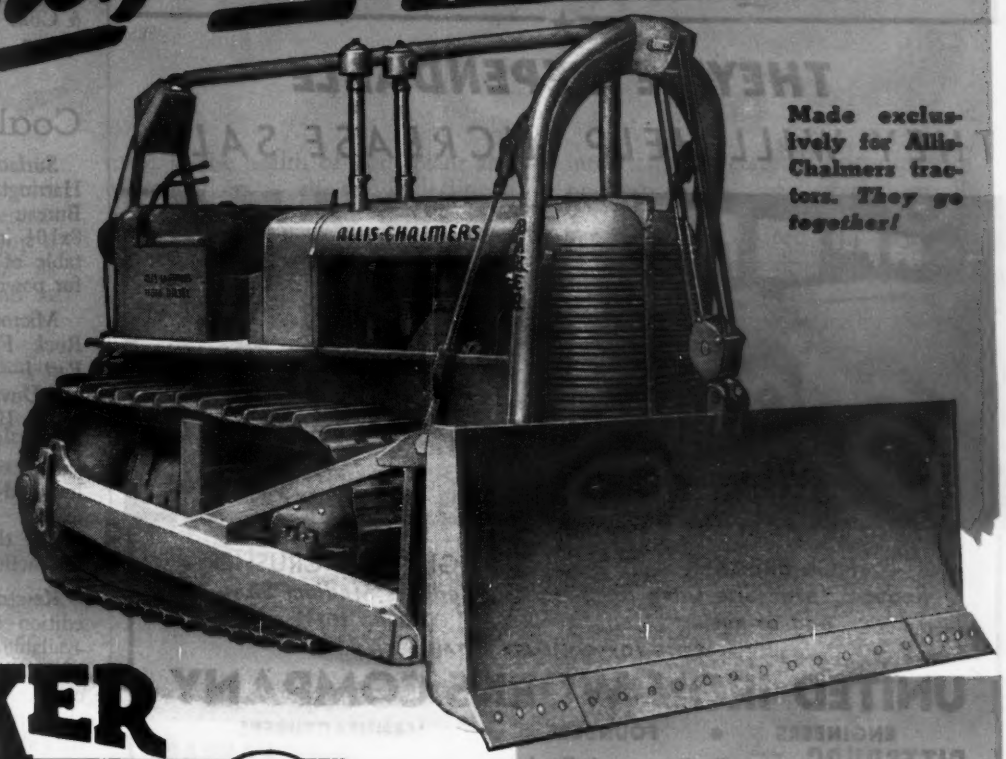
W. W. Bridges, 72, president, Black Diamond Coal Mining Co., Drakesboro, Ky., died March 10 in Washington, where he had been confined to a hospital for more than two weeks. He had been in the coal business 50 years, being at one time president of the West Kentucky Coal Operators' Association.

Howard Melville Hanna, 67, chairman of the board of the M. A. Hanna Co., Cleveland mining and shipping concern, died March 17 of a heart attack in his automobile. He had suffered from coronary thrombosis for several months.

Arthur G. Shaffer, 55, electrician in charge of all underground equipment at New Orient mine, Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill., died March 6 of a heart attack at his home. He had been in poor health for about three years.

C. Law Watkins, 59, formerly well known in the bituminous coal-mining industry of Pennsylvania and the New York wholesale trade, died March 2 in New Haven, Conn. After his graduation from Yale in 1908 and the acquisition of some knowledge at the mines he organized the Watkins Coal Co., with headquarters in New York City. Several years later he joined the Pennsylvania Coal & Coke Corp. as vice president in charge of oper-

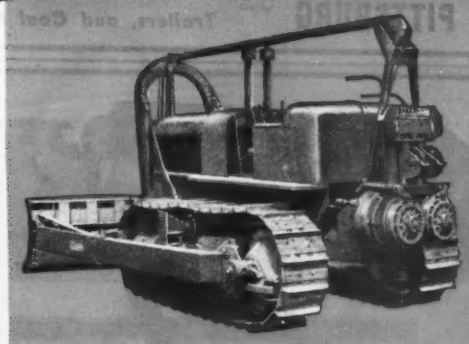
Yes-They Go Together!

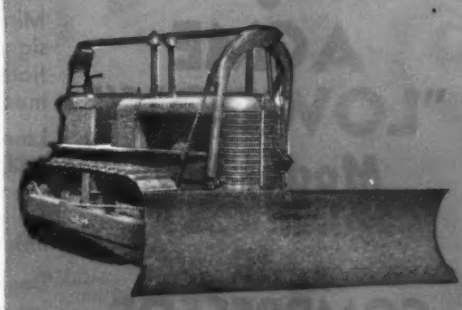


Made exclusively for Allis-Chalmers tractors. They go together!

The New BAKER

Cable Controlled Bulldozer and Gradebuilder and Allis-Chalmers Tractors





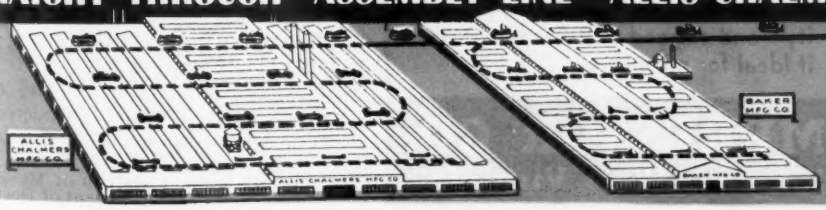
Baker, the greatest name in Hydraulic Bulldozers, announces the new Baker Line of Cable Controlled Bulldozers and Gradebuilders. Designed with the full cooperation of Allis-Chalmers and Baker engineers and thoroughly tried and field tested under their joint supervision, here's more evidence that Baker Equipment and Allis-Chalmers Tractors *"go together."*

Features include • 5-position tilting blade on both bulldozers and gradebuilders • "Air-conditioned" cone clutches and differential or self-energizing brakes with all adjustments within easy reach • Rugged tubular steel superstructure • Double and single drum power control units for use on rear, and single drum for use on front power take-off. Available as separate units • Simple to operate and maintain, sturdy construction, well-balanced, minimum weight. Send for literature.

THE BAKER MFG. CO.

514 Stanford Ave., Springfield, Illinois

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

"UNITED" SINGLE AND DOUBLE ROLL CRUSHERS . . . PICK BREAKERS

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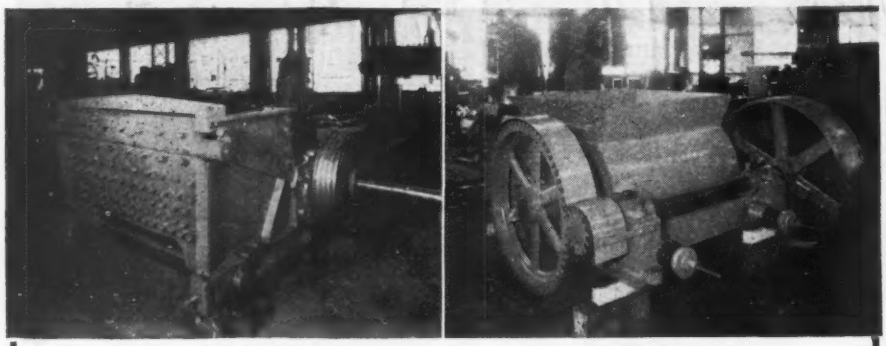
THEY WILL HELP INCREASE SALES



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Reduces Large Size Lump to egg or nut

SINGLE ROLL CRUSHER
Reduces Medium Size Lump to 1"

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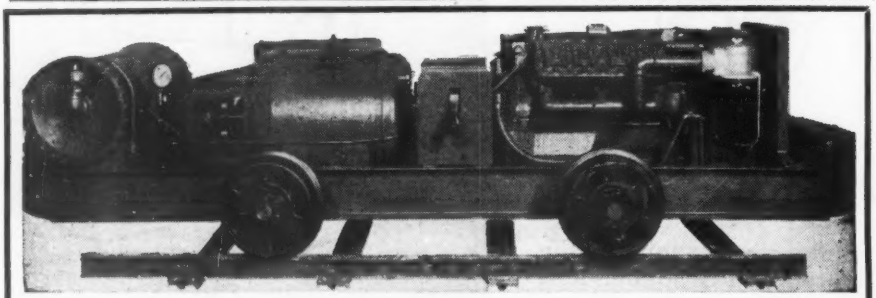

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For full particulars on construction, operation, and general specification.

The Model 110 Acme "Lowboy" Mine Car Air Compressor is designed to meet the mining conditions existing today, especially in mechanized mining.

Low—compact—light weight—it is adaptable to both high and low seam operations and offers the additional advantage of efficient, economical service.

Designed particularly for mine service the unit is an adaptation of the Schramm Fordair which has proved highly efficient and dependable in many fields of service.

Its mechanical simplicity—portability—and rugged construction make it ideal for mine use.

ACME COMPRESSOR CO.
Williamson, West Virginia

ations. He resigned in 1929 to become associate director of Phillips Memorial Gallery, director of the Phillips Gallery Art School and adjunct professor of art at American University, all in Washington, D. C. His father, Thomas H. Watkins, former president of the Pennsylvania Coal & Coke Corp., lives in retirement in New Haven.

•

Coal Publications

Surface Storage of Explosives, by D. Harrington and R. G. Warncke, U. S. Bureau of Mines.* I.C. 7307, 28 pp., 8x10½ in.; paper, mimeograph. American table of distances, barricades and designs for powder houses.

Microseismic Method of Predicting Rock Failure in Underground Mining; Part 1—General Method, by L. Obert and W. Duvall, U. S. Bureau of Mines.* R.I. 3797; 10 pp., 8x10½ in.; paper, mimeograph. Frequency of microseismic disturbances always increases ten- to one hundred-fold immediately before rock failure. The larger the area affected, the longer the period of increasing microseismic activity prior to failure.

Keystone Coal Buyers Manual—1945 edition is now "on press" and will be available for distribution about May 1. The 1945 edition contains listings of all active coal mines in the United States and Canada that produce over 100 tons daily. Detailed data shown include names and addresses of executives and mine officials; details as to location, seam, preparation mining, haulage and electrical equipment, 1943 production figures, etc. The 1945 Keystone also includes complete directory sections and detailed information on coal sales organizations; mechanical coal cleaning plants and coal trade names. Price $10. Address, Keystone Coal Buyers Manual, 330 West 42d St., New York 18, N. Y.

Improvement of Labor Utilization Procedures by W. D. Evans. Bureau of Labor Statistics, U. S. Department of Labor†, Bull. 807, 44 pp., 5⅞x9⅛ in.; paper. Price, 10c. Advice on absenteeism, services for employees, labor turnover, preventing quits, recruitment procedures, induction and training, supervision and counseling, employment of physically handicapped, training and upgrading of workers, wage structure, working hours, etc.

Management at the Bargaining Table, by L. H. Hill and C. R. Hook. McGraw-Hill Publishing Co. 300 pp., 6x9⅛ in.; cloth. Price, $3. Specific subjects are union-, management- and employee-protective clauses, seniority, grievance handling, miscellaneous clauses, the agreement, preparation for negotiation, negotiation, collective bargaining and the War Labor Board.

Stress Relief of Weldments for Machining Stability, by J. R. Slitt. Ohio State University Studies, Engineering Series, Bull. 121; 47 pp., 6x9 in.; paper. Price, 50c. Tests were made to find to what extent welds would be rendered more stable for machining operations by heat-

* Apply to U. S. Bureau of Mines.
† Apply to Superintendent of Documents.

WE PUT THE MILKMAN ON OUR PAYROLL

EVERY DAY—at the fatigue point in each shift—every Thermoid employee is served a container of energizing milk. And the workers enjoy a relaxing "seventh inning stretch" as the containers are handed around at machine, bench and desk.

How did we come to put the milkman on our payroll?

One answer is found in the results of his visits . . . the noticeable improvement in the health of both plant and office workers . . . the steady decline in fatigue-born accidents . . . the equally steady, over-all rise in the quality of Thermoid production.

Another important reason, however, was the unique spirit of cooperation that governs all activities here at Thermoid. Long ago, we learned that the sides of the business triangle—the employer, the employee and the customer—are held together by common interests; and retarded functioning of one impairs the useful strength of all.

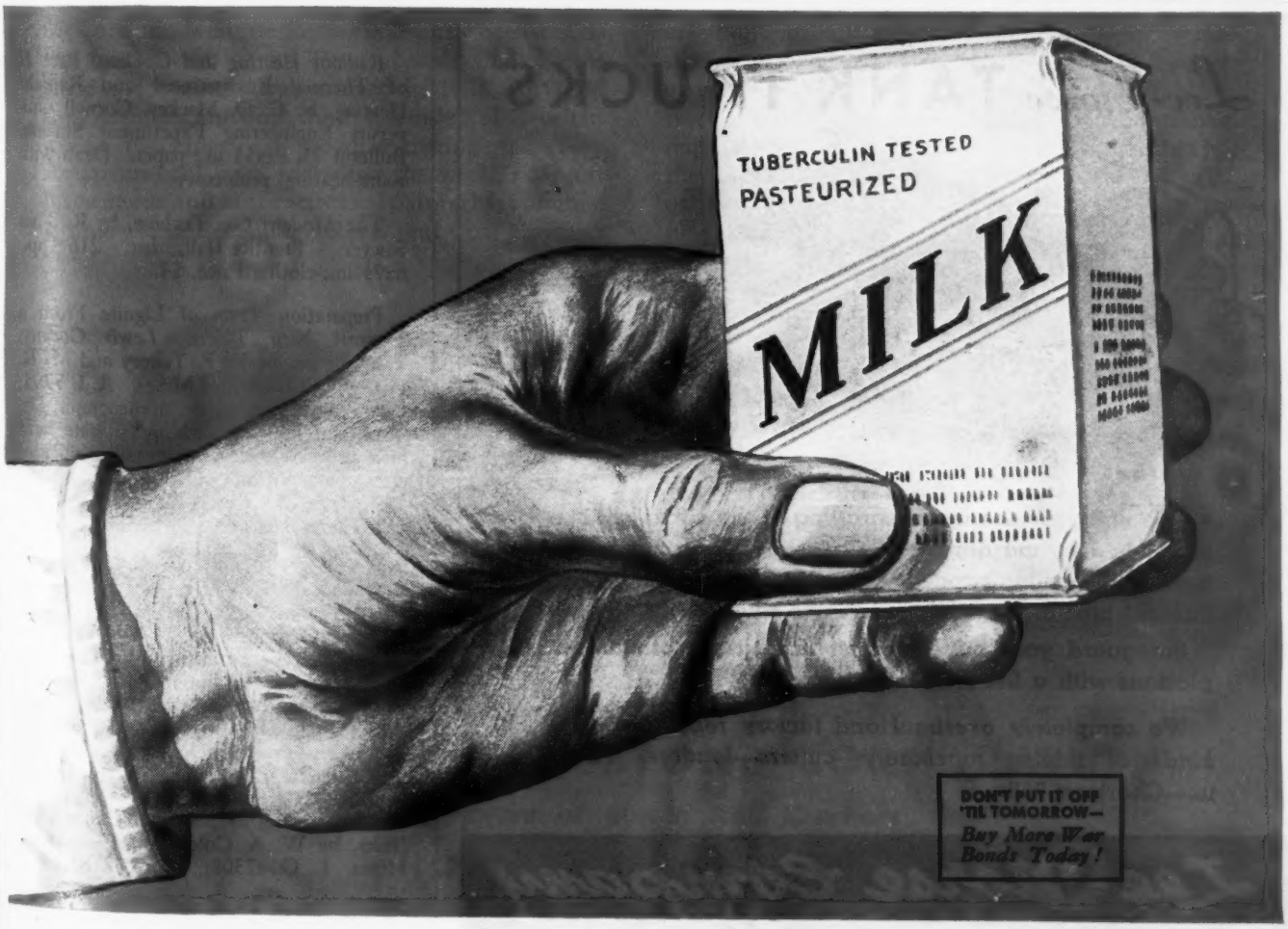
Thus, the idea of free milk each shift is neither paternalism nor soft persuasion in the minds of Thermoid workers; but is welcomed by them as a common sense way of meeting a mutual problem. And that is the spirit that makes our customers say: "It's Good Business To Do Business With Thermoid."

Thermoid Rubber

DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: **TRANSMISSION BELTING • F.H.P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.**

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID



MORE PROFIT FROM THE BOTTOM OF THE BARREL

America is scraping the bottom of the barrel to keep production going. Coal operators are doing it, too, salvaging badly needed fuel from waste heaps and culm banks . . . and doing a profitable job of it —thanks to Plat-O Coal Washing Tables.

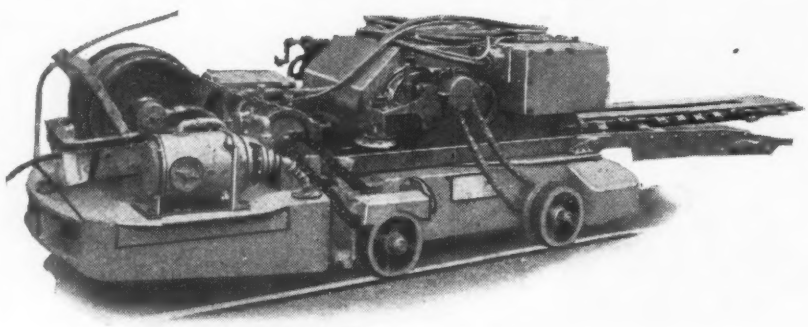
A Plat-O Table can reclaim sizes down to 1/16" x 0" . . . one table can reclaim 15 or more tons per hour . . . and one man can take care of up to 20 tables because separation is automatic and always in full view.

For added profits from the "bottom of the barrel," why not let Deister engineers tell you more about Plat-O Coal Washing Tables? Write today for complete information.

DEISTER MACHINE COMPANY

Fort Wayne 4, Indiana

Lee-Norse TANK TRUCKS



• This unit provides water spraying of the cutter chain—prevents dust and danger of explosion in workings. The tank of 180 gallon capacity is built into and becomes an integral part of the mining machine truck.

Safeguard your mine against the hazard of dust explosions with a Lee-Norse Tank Truck.

We completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders. Phone us—Charleroi 750.

Lee-Norse Company

CHARLEROI, PA.

ing at maximum temperatures of 900, 1,000, 1,100, 1,200, 1,300 and 1,400 deg. F.

You and the Returning Veteran—A Guide for Foremen. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. 40 pp., 5x7; paper; free to interested groups or employers. Prepared in cooperation with the Wisconsin Society of Mental Hygiene, this publication delves deeply into the foremen's responsibilities and opportunities in returning veterans to civilian employment, with specific material on how they can speed any necessary adjustments, either mental or physical.

Wrought Iron for Radiant Heating. A. M. Byers & Co., Pittsburgh, Pa. 53 pp., 8½x11 in.; paper. The title is misleading, as references to wrought iron are almost undiscoverable. All phases of the subject of radiant heat are explored—churches, dispensaries, traverns, libraries, factories, personnel rooms, offices and residences.

Explanation of Tentative Inspection Standards for Anthracite Mines. U. S. Bureau of Mines, Miners' Circular 46. 118 pp., 5⅞x9⅛ in.; paper.† A bibliography listing books to which reference is made in the text is to be found at the close of this pamphlet, so that more detailed explanations may be sought.

Bibliography of Bureau of Mines Investigations on the Production of Liquid Fuels From Oil Shale, Coal, Lignite and Natural Gas, by A. C. Fieldner and Paul L. Fisher, U. S. Bureau of Mines. I. C. 7304; 18pp., 8x10½ in.; paper, mimeograph.

Radiant Heating and Cooling, Part II of Thermal Environment and Radiant Heating, by C. O. Mackey, Cornell University Engineering Experiment Station. Bulletin 33, 8½x11 in.; paper. Deals with room-heating problem.

The Modern Gas Turbine, by R. Tom Sawyer. Prentice-Hall, Inc. 216 pp., 6x9¼ in.; cloth. Price, $4.

Preparation Tests of Lignite From a Deposit Near Toledo, Lewis County, Washington, by H. F. Yancey and M. R. Geer, U. S. Bureau of Mines. R. I. 3795; 16 pp., 8x10½ in.; paper, mimeograph. Demands for coal in Washington State have increased immensely, so the availability of a stripping prospect with 40 ft. of lignite and 43 ft. of cover is under study. Not a mechanical cleaning investigation, however.

Studies on Explosives and Explosions, Fiscal Year 1944 by W. J. Huff, U. S. Bureau of Mines. R. I. 3794; 46 pp., 8x10½ in.; paper, mimeograph. Only last eleven pages are of interest to coal men. Studies on use of more than 1.5 lb. of unsheathed explosives in coal mines satisfied Bureau that, under certain circumstances, this charge limit could be raised to 3 lb.

Shaft Sinking by Stripping Churn-Drill Holes, by W. A. Cole, U. S. Bureau of Mines. I. C. 7308; 8 pp., 8x10½ in.,

† Apply to Superintendent of Documents.

RUGGED • DEPENDABLE • ECONOMICAL

McLANAHAN

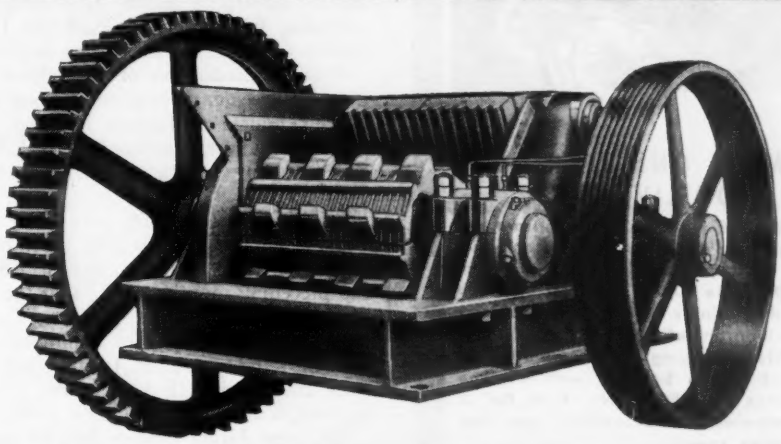
COAL AND ROCK

CRUSHERS

GIANT ROCKMASTER

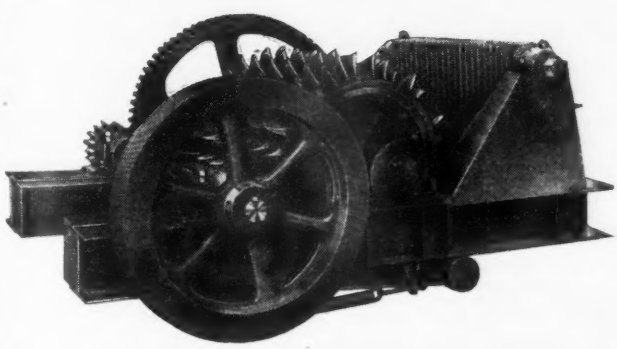
One side and rear hopper plates removed

Hard surfaced segment roll teeth . . . cast steel gears . . . V-belt drive . . . four reversible and interchangeable wearing plates on steel crushing plate . . . industrial type fittings. Available in any size or capacity for handling rock and mine refuse.

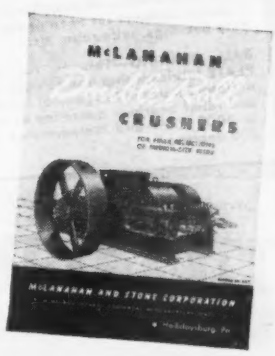


Pit, Mine and Quarry Equipment HEADQUARTERS since 1835 . . .

McLanahan & Stone Corporation has been building machinery in the Pennsylvania Coal Fields since the business was started in 1835. In 1894 they designed and built the first Single Roll Crusher. These machines are now operating in every American coal field, including the world's largest bituminous and anthracite coal plants. McLanahan Primary and Secondary Rock and Coal Crushers are built in all practical sizes of steel, semi-steel, and fabricated steel—with babbitt, bronze or roller bearings. Solid or segment rolls in alloy steel or chilled iron are available for any specific requirement. All machines are safety-protected by the automatic steel strut toggle, breaking blocks or shear pins. Adjustments are made by ratchet-hand-wheel or different length breaking blocks.



Fabricated Steel Automatic Steel Strut Quick Adjustment *Black Diamond* Crusher. Cut steel gears, manganese steel segment roll, reversible tip, V-belt drive, industrial type lubrication. Used for cracking lump coal. (Hopper, guards and part of toggle removed.)



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McLANAHAN AND STONE CORPORATION

Originators of Single Roll Crushers

HOLLIDAYSBURG, PA.

LUBRIPLATE No. 205

MAKE ONE BEARING OUTLIVE TWO

LUBRIPLATE No. 205 is a lubricant developed for use in grease type anti-friction bearings operating at speeds from 5000 RPM to 20,000 RPM. Users of high speed machinery tell us that this remarkable lubricant often more than doubles the life of bearings. For the lubrication of anti-friction bearings with oil type housings LUBRIPLATE No. 1 or No. 2 is recommended depending upon the operating speed.

Rx FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

No. 70—For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

Write for a booklet, "The LUBRIPLATE Film", written especially for your industry.

LUBRIPLATE

FISKE BROTHERS REFINING CO.

NEWARK 5, N. J.
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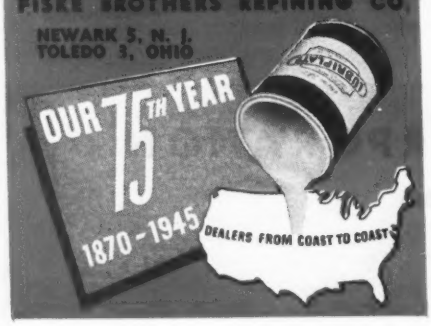


paper, mimeograph. A 12-in. or larger hole is drilled in center of proposed shaft, and concentric shots are fired. Muck thus formed is shoveled to center hole and goes to mine. Shaft is lined with steel liner plate. Cost without liner plate, supervision, overhead and equipment rentals, $21 per linear foot; with liner plate, $34.67.

•

Coal-Mine Fatalities Below Recent Levels

Accidents at coal mines of the United States caused the deaths of 79 bituminous and 10 anthracite miners in January last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 52,200,000 net tons, the accident death rate among bituminous miners in January last was 1.51 per million tons, compared with 1.72 in the preceding month and 1.70 in January, 1944.

The anthracite fatality rate from accidents in January last was 2.36, based on an output of 4,241,000 tons, against 2.84 in the preceding month and 2.78 in the first month a year earlier.

For the two industries combined, the accident fatality rate in January last was 1.58, compared with 1.82 in the preceding month and 1.80 in January, 1944.

Fatalities during January last, by causes and States, as well as comparable rates for the first month of 1944 and 1945, were as follows:

St. Louis

HOTEL MAYFAIR

DOWNTOWN ST. LOUIS
AT YOUR DOORSTEP

U. S. COAL-MINE FATALITIES IN JANUARY, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Total Underground	Open-cut	Surface	Grand Total
Alabama	2	..	..	..	..	..	2	4	..	..	4
Colorado	2	1	1	..	..	..	..	4	..	..	4
Illinois	7	..	..	..	..	..	1	8	..	1	9
Indiana	..	..	1	..	1	..	..	2	..	..	2
Iowa	1	..	..	..	..	..	..	1	..	..	1
Kentucky	3	..	3	3	..	1	..	10	..	..	10
Ohio	..	..	..	..	..	..	..	..	1	..	1
Oklahoma	1	..	..	9	..	..	..	10	..	..	10
Penna. (bituminous)	5	..	3	..	..	..	1	9	..	..	9
Tennessee	1	..	1	..	..	..	..	2	..	..	2
Utah	1	..	1	..	..	..	..	2	..	1	3
Virginia	1	..	2	..	..	..	1	4	..	..	4
West Virginia	8	..	8	..	1	..	1	18	1	1	20
Total bituminous	32	1	20	12	2	1	6	74	2	3	79
Penna. (anthracite)	7	..	..	..	1	..	..	8	..	2	10
Grand total	39	1	20	12	3	1	6	82	2	5	89

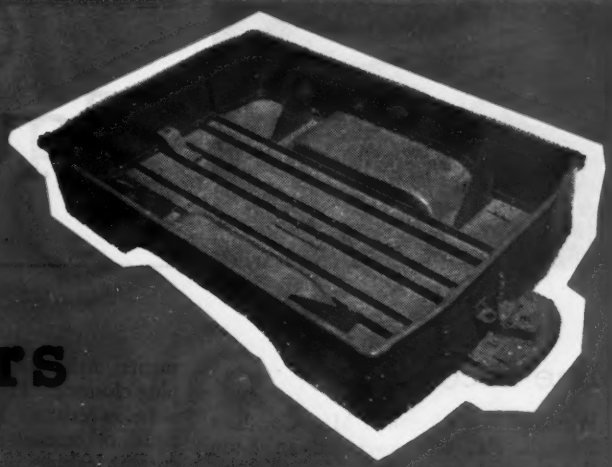
DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

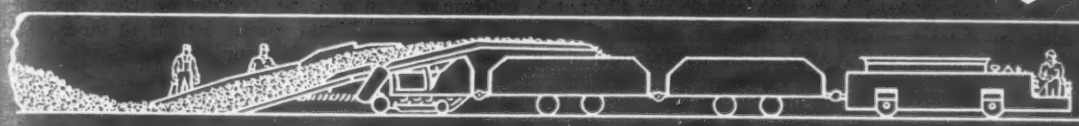
January, 1944 and 1945

Cause	Bituminous: Number Killed		Killed per Million Tons		Anthracite: Number Killed		Killed per Million Tons		Total: Number Killed		Killed per Million Tons	
	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945
Underground:												
Falls of roof and coal	52	33	0.963	0.632	6	7	1.193	1.650	58	40	0.983	0.709
Haulage	21	20	.389	.383	3	..	.597	....	24	20	.407	.354
Gas or dust explosions:												
Local	..	3	....	.058	1	..	.199	....	1	3	.017	.053
Major	..	9	....	.173	..	..	....	....	..	9	....	.160
Explosives	1	2	.019	.038	3	1	.597	.236	4	3	.067	.053
Electricity	2	1	.037	.019	..	..	....	....	2	1	.034	.018
Machinery	4	6	.074	.115	..	..	....	....	4	6	.067	.106
Shaft	2	..	.037	....	..	..	....	....	2	..	.034	....
Miscellaneous	3	..	.035	....	..	..	....	....	3	..	.051	....
Stripping or open-cut	2	2	.037	.038	..	..	....	....	2	2	.034	.035
Surface	5	3	.093	.057	1	2	.198	.472	6	5	.102	.088
Grand total	92	79	1.704	1.513	14	10	2.784	2.358	106	89	1.796	1.576

* All figures subject to revision.

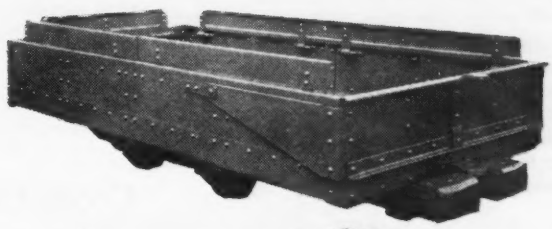
Match Your CARS to Your Loaders

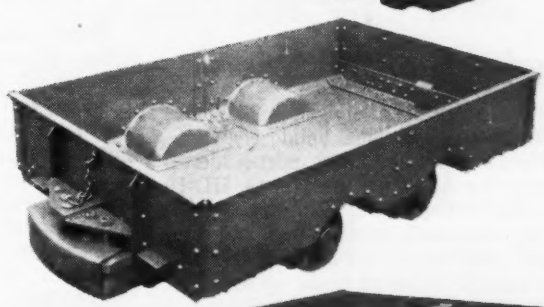


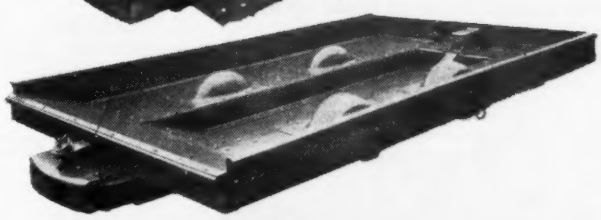


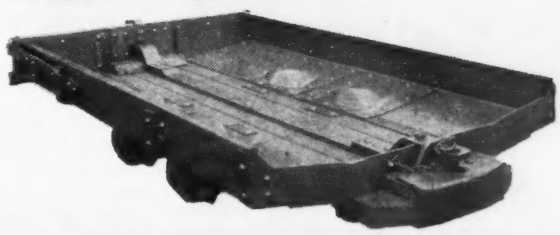
To get the utmost efficiency from your mechanical loaders . . . your *cars* must be adapted to machine loading.

Here are some designs, for instance, for loading in low headroom.









Enterprise

ENTERPRISE Care are leaders in LOW COST HAULING, because they are properly designed to operate with your loading system, either mechanical or hand-loading.

Our engineers will work with you in developing a design to meet your particular haulage conditions.

Your inquiries are solicited.

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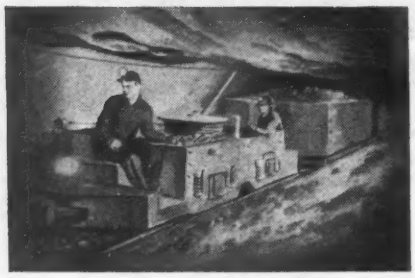
WHEEL & CAR CORPORATION

BRISTOL, VA.—TENN. HUNTINGTON, W. VA.



Equipment News

Mine Locomotive

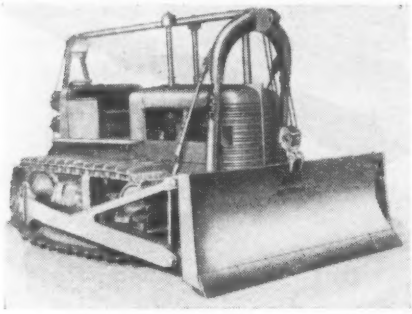
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed an 8-ton dual-duty explosion-tested mine locomotive. Perfected to fill the need for a suitable locomotive for mechanized mines, this unit is designed for a dual purpose: gathering and swing operations.

The usual low speed is for gathering when the locomotive is operating behind the loading machine. For this service the motors operate at greater field strength to develop maximum tractive effort at low speed and with minimum power usage. The new second speed is for swing service when operating on secondary haulage. For this service the motor fields may be weakened to obtain an increase in speed of about 40 percent, enabling the locomotive to make the longer movements at an economical speed.

•

Hydraulic Bulldozers

Baker Mfg. Co., Springfield, Ill., offers a line of cable-controlled bulldozers, gradebuilders and power control units made exclusively for Allis-Chalmers HD-14, HD-10 and HD-10W tractors. Features include: strong reinforced tubular arch and box-welded moldboard; five-position side arm that permits tilting of blade up to 10 in.



on the bulldozer and 12 in. on the gradebuilder from a perpendicular position; 42-in. blade lift above ground on bulldozer, 50 in. on gradebuilder; blade drop below ground level limited only by length of cable.

•

Blasting Caps

All electric blasting caps now produced by E. I. duPont de Nemours & Co., Inc., Wilmington, Del., have two improvements: nylon-insulated wires and rubber-plug closures. The wire covering of tough, abrasion-resistant nylon is said to be the equal of enamel insulation in preventing current leakage; not affected by extreme or rapid changes in temperature, and comes in brilliant colors, minimizing the possibility of error in connections.

In addition to reducing the possibility of misfires the new wires are clean to handle and resist kinking. The rubber-plug closures, double crimped in the shells, replace the combination of bridge plug, asphaltic waterproofing and sulphur seal, thus increasing resistance to water penetration. The new shells are much shorter than the old type without sacrificing explosive strength, making the priming easier and safer.

•

Cross-Flow Classifier

Denver Equipment Co., Denver, Colo. offers a new classifier embodying the "cross-flow" principle of operation. The overflow weir is on the side opposite the feed rather than on the end of the classifier; the conveyor flights are in line with the direction of pulp flow across the classifier. These features, it is said, permit an uninterrupted, smooth flow of pulp across the classifier from feed entrance to overflow weir. Bulletin C5C-B gives further details, with complete specifications and dimension diagrams.

•

Self-Locking Pins

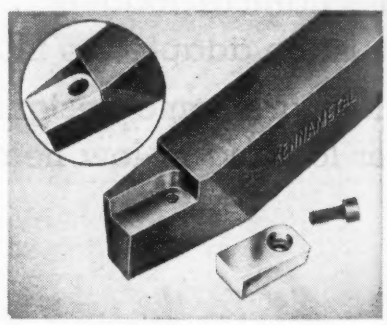
Driv-Lok Pin Co., Chicago, offers a complete line of standard and special self-anchoring, vibration-proof pins designed to replace more expensive taper pins, keys, cotterpins, setscrews, rivets, etc. These pins, which are pressed or driven into standard drilled holes, have four flutes on the surface parallel to the axis. The length and position of the flute can be controlled accurately so that fully or partially grooved pins are available. Fully grooved pins have a pilot at one end so that the pin can be easily inserted.

The raised, work-hardened edges of these flutes provide an expanded diameter of a few (specified) thousandths greater than the nominal diameter of the pin. When the pin is inserted in a drilled hole, these raised edges are compressed inward, providing a resilient, self-locking element that, it is asserted, will hold indefinitely under vibration or shock conditions. They are available in sizes from $\frac{3}{64}$ to $\frac{1}{2}$ in. diameter and from $\frac{3}{16}$ to $4\frac{1}{2}$ in. in length, in any material, and in a wide variety of types. These new pins are now available in a broad category of sizes, types, materials and special designs to meet all types of industrial applications.

•

Tool Blank

Kennametal, Inc., Latrobe, Pa., has developed a new type of tool blank having a drilled and counterbored hole to provide for attachment to a steel shank by means of a recessed-head capscrew. The angu-



larly set screw serves merely to hold the tip against the recess walls, which resist the main cutting thrusts.

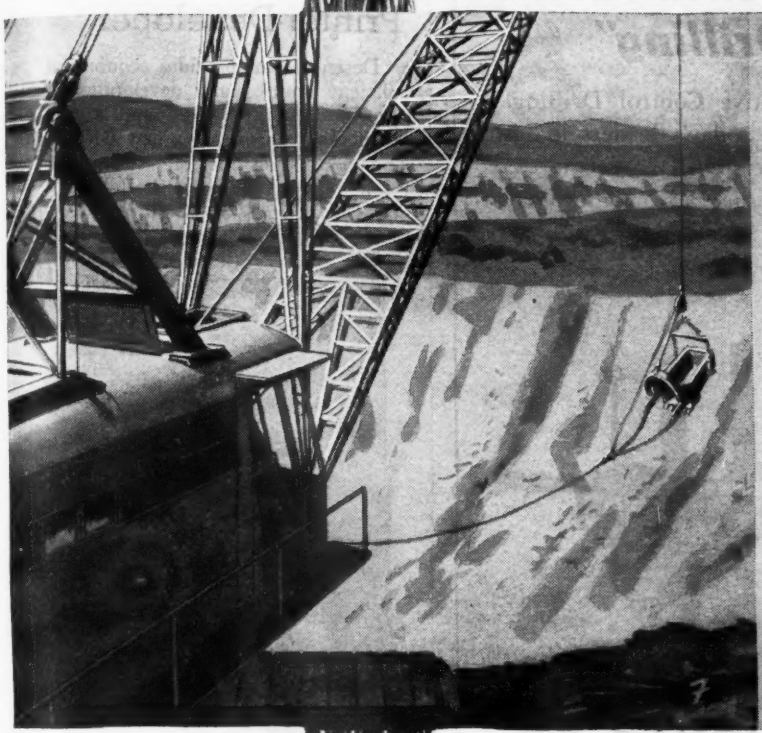
These blanks are available in several of the larger sizes, with formed clearance angles, right hand or left hand, and in all standard grades of Kennametal. Complete tools of various styles—straightedge, lead angle, offset, etc.—can be furnished with the screwed-on tips, or separate standard blanks will be supplied to those who wish to make their own tools. Blanks of non-standard shapes and sizes having this feature also may be had for special tools.

•

Rust Preventive

Kendall Refining Co., Bradford, Pa., offers Kendall Rust Preventive 5, consisting of wax concentrates in solution with petroleum solvents, with a drying time said to be well under one hour. It also is said to have excellent water-repellent characteristics, to withstand seashore exposure and to be as satisfactory from the protective standpoint in such laboratory tests as ultra violet light, humidity cabinet and salt spray cabinet, with low temperature characteristics requiring ductility as low as 20 deg. below zero. Among features claimed for it are easy application by

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE



J&L
PERMASET
WIRE
ROPE

Precisionbilt—with extra factor of safety for mining. Safety of life . . . protection of equipment . . . are two vital requisites in wire rope for virtually all needs—especially in strip mining. J&L Wire Rope gives you the extra safety you need . . . for it is Precisionbilt from J&L Controlled Quality Steel . . . on machines of extreme accuracy . . . and pre-formed for easier installation . . . greater freedom from fatigue and friction . . . for longer, more economical service.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

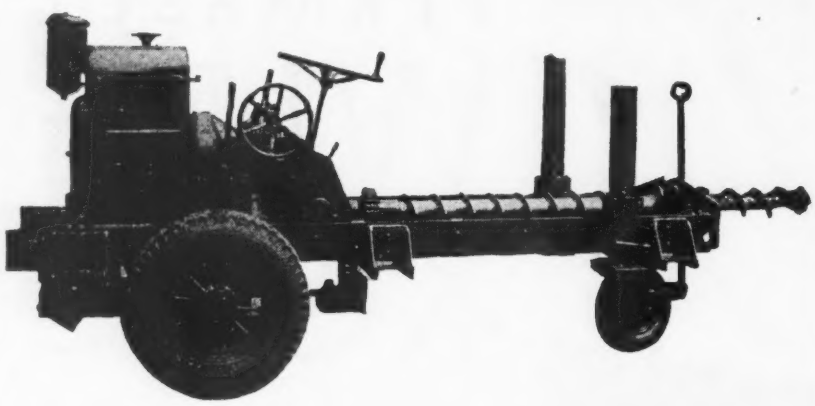
PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



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PARIS, ILLINOIS

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for bringing business needs or opportunities to the attention of men associated in administrative, executive, management, sales and responsible technical, engineering and operating capacities with the industries served by

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330 W. 42nd St., New York 18, N. Y.

brush, spray or dipping; quick drying time and ease of removal with any petroleum solvent or kerosene.

•

Printer-Developer

Designed to provide economical and efficient printing and developing facilities for those requiring black and white prints in medium quantities, a new BW printing and developing machine, known as the Model 41, is offered by the Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41. It is said to have a printing speed range up to 6 ft. per minute, depending on the transparency of the original, printing either roll stock or cut sheets with a printing width of 46 in.

•

Dust Collector

A unit type dust collector said to be powerful yet inexpensive is offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. It readily fits behind or beside machines as they stand. Dust-laden air is drawn through the inlet pipes into twin cyclone separators, the lighter air passing on through a viscous coated filter, where very fine dust is removed. Clean air is discharged back into the room. The filter consists of 20 layers of viscous filter paper. To restore the filter's efficiency after it becomes dirty it is necessary only to peel off the first two layers.

•

Blow Guns

Since air and water hose in industrial plants and other places are very often used with spray guns, nozzles and hand-operated valves, the B. F. Goodrich Co., Akron, Ohio, is adding to its line of industrial hose a complete series of Lonn blow guns, whose finger-tip control is said to be made possible by the use of rubber.

Made by the Lonn Mfg. Co., Indianapolis, Ind., these blow guns, known as air savers and water savers, are offered in several styles with various degrees of flow or restricted flow. The Lonn valve features an internal trigger principle and involves only three principal working parts. It is

Wyoming RED EDGE

RIVETLESS SOCKET FEATHERWEIGHT

Coal Shovels and Scoops

BALANCE AND WEIGHT

Red Edge Featherweight coal shovels and scoops with their rivetless, smooth surface socket and alloy steel blades, are light in weight, unequaled in toughness and famous for their ability to resist abrasive wear.

For Bituminus Coal specify Red Edge Coal Shovels and for Anthracite Coal, Red Edge Coal Scoops.

ARMY E NAVY

AMES PRODUCTS
SHOVELS
SPADES
SCOOPS
FORKS
RAKES
HOES
Post Hole Diggers

AMES *Since* 1774

AMES BALDWIN WYOMING CO.

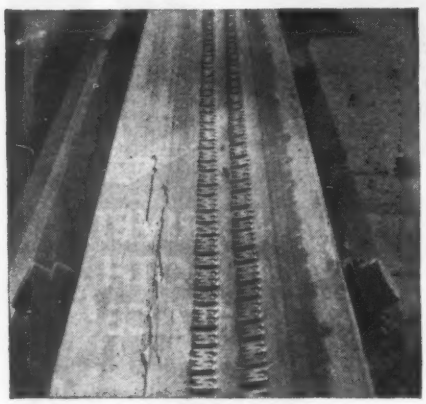
PARKERSBURG, W. VA. NORTH EASTON, MASS.

CONVEYOR BELTS

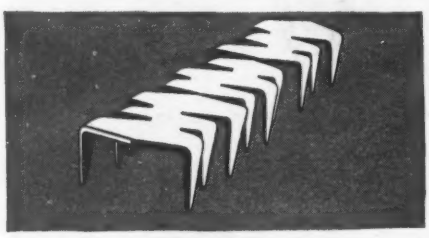
fastened or repaired

ON THE JOB

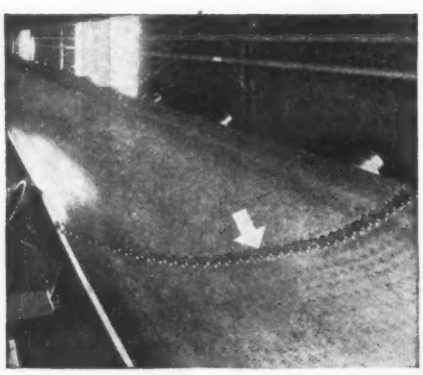
in a few minutes



All you need are hammer, block of wood and . . . .



BRISTOL'S BELT LACING



For rubber or woven conveyor belts up to $\frac{13}{16}$" thick.

Write for Bulletin 736.

THE BRISTOL COMPANY

Mill Supply Division

139 Bristol Road, Waterbury 91, Conn.

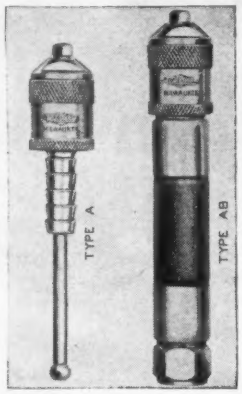
DISTRIBUTORS EVERYWHERE

opened and closed without the use of springs, levers or pushbuttons; merely by flexing the rubber nozzle or hose.

•

Leakproof Air Guns

A new line of leakproof air guns for blowing out chips, dust, dirt; kicking out finished parts and operating air-driven tools such as vises, clamps, chucks, presses, etc. is offered by the Trico Fuse Mfg. Co., 2948 North Fifth St., Milwaukee 12, Wis. Type A is said to be more popular for



permanent applications. Type AB is recommended for remote-control applications; attached directly to the air pipeline it is operated by hand, knee or foot control, treadle, pulleys, cams, plungers, etc. Available in three styles and for complete range of hose diameters. Complete description in Bulletin 40.

•

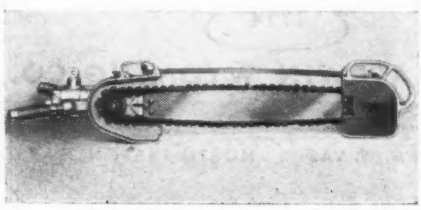
Haulage Equipment

A new Junior Phil-Dump car has been added to its line of haulage equipment by Phillips Mine & Mill Supply Co., 2212 Jane St., Pittsburgh, Pa. A hand-push model, the Junior Phil-Dump has ½ cu.yd. capacity and is available with solid rubber tires only. Over-all dimensions are 66 in. long, 38¼ in. high and 24¼ in. wide. Tractor models are made in 1 and 2 cu.yd. capacities; Super-Tractor model is of 3 cu.yd. capacity. Bulletin gives full particulars.

•

Compressed-Air Saw

A compressed-air saw weighing 42 lb., operated by a 3½-hp. motor at 90 cu.ft. of air at 90 lb. pressure, with a cutting capacity of 24 in. is offered by the Lombard Governor Corp., Ashland, Mass. A 5-hp. 36-in. cutting blade also is available, as well as 24- and 36-in. electric models. Features emphasized by the manufacturer are: safety guard the full length of the top for protection when the saw is operating; entirely new interlocking chain construc-



PROTECTION

when and where

NEEDED MOST

Each Hodgman garment is designed for a specific use or occupation to stand up under the most severe service conditions. All fabrics, coated in our own plant, meet the most rigid government specifications. All Hodgman garments are reinforced in the proper places, are waterproof and provide the utmost in comfort. There is a Hodgman garment for almost every industrial use.

PROTECTIVE CLOTHING

Address Dept. C-1 — *for latest Catalogue*

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YOUR MINE IS DIFFERENT? SO IS RED CROWN!

Let Us Show You The Greatest Improvement in Mining Explosives During The Last 60 Years!

● The greatest forward step in mining explosives during the last 60 years was made when, in 1938, the King Powder Company introduced Red Crown —the patented Class A Permissible.

Red Crown has the most effective gas release ever obtained with any Permissible. And though your mine *is* different—your conditions *are* unusual —there is still every probability that Red Crown will be the ideal explosive for you.

Let us demonstrate Red Crown in your mine! Watch Red Crown at work and be your own judge of its results.

Arrange now for a Red Crown demonstration at no cost or obligation to you. See your King representative—or get in touch directly with us.

THE KING POWDER CO., INC.

CINCINNATI 1, OHIO.

INCORPORATED 1878

LOOK FOR THESE SIX ADVANTAGES IN EVERY RED CROWN SHOT!

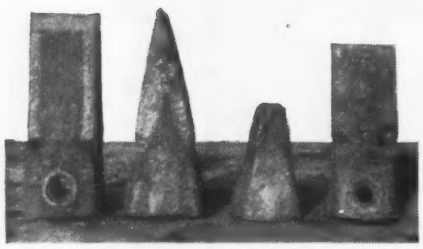
1. Slow heaving and spreading action with results like those obtained with the use of black powder.
2. Power distributed evenly throughout the face of the cut.
3. Coal displaced in firm, hard lumps with minimum of pin cracks.
4. Red Crown, *containing no nitro-glycerine,* is the non-headache Permissible.
5. Less smoke and fumes mean less *idle* time for expensive equipment.
6. Red Crown is easy on walls and roof.

RED KING CROWN

THE PATENTED, SURFACE-SENSITIZED PERMISSIBLE

Your Worn Dipper Teeth Are Still

"Good as Gold!"



From left to right: (1) Ready for service,—bucket tooth hard-faced along sides and at point after new tip has been welded on worn tooth. Note hard-facing protection around hole. (2) The same tooth, side view. (3) Typical worn tooth. (4) The same after welding on a new tip.

DON'T DISCARD old bucket teeth,—no matter how badly worn. Rebuilding and hard-facing with Coast Metals will make them good as new,—at less than half the cost of new replacements!

In fact, Coast Metals Hard-Facing makes your power shovel and bucket lips and teeth *better than new*, since they will outlast and outwear ordinary unprotected lips and teeth several times. You can use Coast Metals Hard-Facing also for minimizing wear on tractors, dirt movers, rooters, rippers, crushers and other earth-moving and road building equipment.

Patented Coast Metals Hard-Facing alloys are easily welded to all ferrous metals, including manganese steel, alloy steels, cast iron and chilled iron. Write for full details.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
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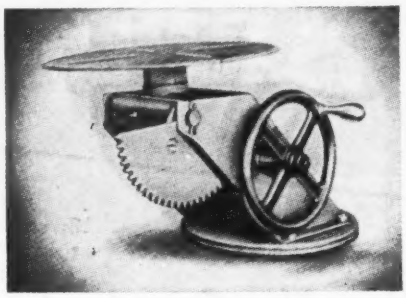
COAST METALS
hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

tion; strong links; easier link replacement and fast cutting action. A narrow kerf with a sequence of only four teeth, it is said, uses little power with great strength.

•

Positioner

Ransome Machinery Co., subsidiary of Worthington Pump & Machinery Corp., 1423 South Ave., Dunellen, N. J., offers a bench model hand-operated positioner to facilitate repairing, welding, overhauling and similar operations on mining equipment. Its capacity is said to be 100 lb.,



with the center of gravity 3 in. above the table; has a tilting range of 150 deg., revolves 360 deg. and can be locked in position at any degree of tilt. The 16-in. table top is equipped with $\frac{5}{16}$-in. slots.

•

Stock-Handling Cart

To save steps and material handling in stockrooms, toolrooms, shipping departments and numerous other operations, Lyon Metal Products, Inc., Aurora, Ill., recommends its stock-handling cart as an important industrial aid to expedite plant

operation and increase production. Model 2000-11, pictured, is 30 in. long, 16 in. wide and 32 in. high—over all. It is finished in Lyon green baked enamel and is shipped set up.

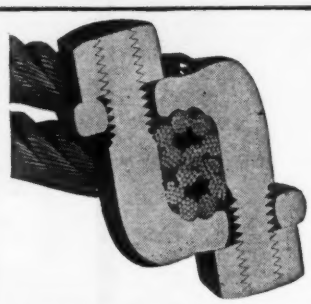
•

Welding Electrode

A new heavy covered arc-welding electrode for flat and horizontal fillet welding as well as for flat butt welding is offered by the Electric Welding Division of General Electric Co., Schenectady, N. Y. Known as Type W-27, the new unit is characterized by an exceptionally high melting rate that results in increased production and higher speeds at the same welding current

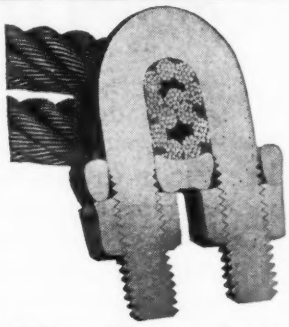
PREFORMED WIRE ROPE DESERVES TO BE HANDLED WITH CARE. SEE WHAT ACTUALLY HAPPENS IN THESE CROSS-SECTION VIEWS.

GRIP...or



Laughlin "Fist-Grip" Safety Clip holds rope firmly by friction — with hardly any flattening.

CRUSH?



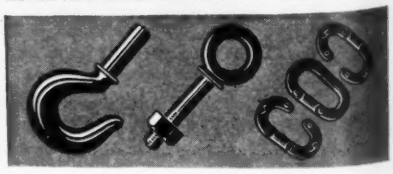
Ordinary U-bolts crush wires, frequently ruining rope ends. (Notice distorted hemp center under "U".)

(Nuts tightened to same tension with torque-indicating wrench in both cases)

"Fist-Grip" Clips protect your rope. 25% fewer can be used, because improved bearing surfaces deliver full rope power. They save time, too, because they go on faster — with any type wrench — and can't be put on backwards. They are the only clips with drop-forged bolts. Order test samples from your distributor today.

Distributed through mill, mine and oil field supply houses. For a complete catalog on Laughlin's wire rope and chain hardware, write to Dept. 6, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN
THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

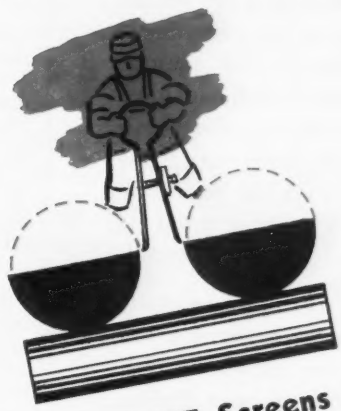


Gone!

THE UPKEEP AND MAINTENANCE HEADACHES COMMON WITH COAL SCREENING

. . . we've installed "BEE-ZEE" *Round-Rod* SCREENS

Your screening maintenance problems can be reduced to a minimum, too, if you change over to longer lasting, quality-built "Bee-Zee" Round-Rod Screens. These sturdy coal screens are made of corrosion-resisting stainless steel, which makes them extremely hard and long wearing. Because of round-rod design original openings between rods are maintained over longer periods of operation. These things add up to more hours of satisfactory service, higher coal production, less screen-changing, less "time-out" for screen maintenance by busy manpower. Bixby-Zimmer Screens are built in sizes and types to exactly fit your needs . . . for sizing, dewatering and drying equipment. Investigate long-life "Bee-Zee" Screens today . . . let our capable engineering staff help you solve screening problems. Write at once for full information.



Why BEE-ZEE Screens Last Longer:

1. ACCURATE OPENINGS MAINTAINED LONGER.
2. ABRASIVE-RESISTING, CORROSION-RESISTING STAINLESS STEEL CONSTRUCTION.
3. ALL WELDED, RUGGED DESIGN.
4. HEAVY-DUTY TIE RODS PROVIDING AMPLE SUPPORT.
5. LESS CLOGGING, OR BLINDING; HIGH COAL OUTPUT.

The High Quality Mark in Coal Preparation Screens

Proved long life in leading coal plants everywhere

BEE ZEE

BIXBY-ZIMMER ENGINEERING CO.

961 Abingdon Street • GALESBURG, ILLINOIS

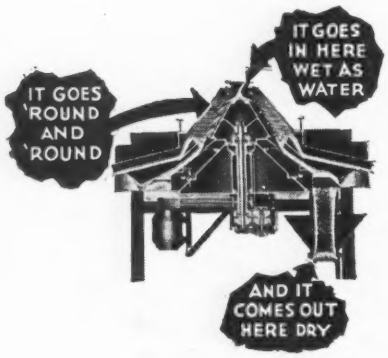
The "C-M-I" CONTINUOUS CENTRIFUGAL

Dewaters granular materials such as the finer coal sizes at a lower cost per ton than any other known method or machine.

And, the dewatered product is in such a physical condition that freezing, clogging of spouts, bins and cars is almost prohibited.

With the liquid being forced through a fine screen by means of the centrifugal forces, the "C-M-I" may be so arranged that considerable amount of the semi-colloidal fines are discharged with the liquid, or arranged so that most of these fines may be recovered.

Our engineering staff will appreciate having the opportunity of going into the details of your drying problems.



Centrifugal and

Mechanical Industries

INC.

3600 South Second Street

St. Louis 18, Mo.

as other electrodes. At comparable production speeds, Type W-27 requires less heat input to the joint, thus reducing warpage and internal cooling stresses.

•

Steel-Cable Belts

A new "Compass 250" transmission belt that utilizes steel cables instead of cord or fabric for the carcass is offered by the Goodyear Tire & Rubber Co., Akron, Ohio. The cables, consisting of a special, twisted, finely stranded, high-tensile wire, are incased in an envelope of non-load-carrying fabric. Half the cables in a belt are twisted to the left and the other half to the right, it is said, to insure a neutralized, true-running belt.

Because the cables are embedded in rubber and incased in a fabric envelope, it is said they can receive no external, strength-reducing wear. In addition, the belts are made with synthetic rubber to resist lubricating oils or other deteriorants. Steel-cable construction is described as giving better life under conditions of high temperature, as the load-carrying steel cables are not as adversely affected by heat as load-carrying cotton cords or duck in conventional transmission belts would be.

•

Industrial Notes

MACWYTHE CO., Kenosha, Wis., has appointed R. P. Tyler as general sales manager. He formerly was sales manager for A. Leschen & Sons Rope Co., St. Louis, and prior to 1940 served in sales and engineering capacities with John A. Roebling's Sons Co., Trenton, N. J. H. E. Sawyer, formerly sales manager as well as vice president and treasurer, will continue as vice president and comptroller.

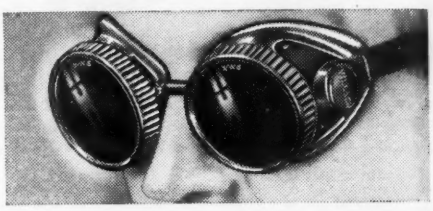
R. G. LETOURNEAU, INC., Peoria, Ill., has promoted M. E. ("Cap") Miller from district representative to central sales manager. He succeeds Howard L. Stilley, who has become manager of the Soule Equipment Co., northern California distributor for LeTourneau.

CUMMINGS ENGINE CO., INC., Columbus, Ind., has announced plans for immediate construction of a new building

WILLSON-WELD LENS FEATURES

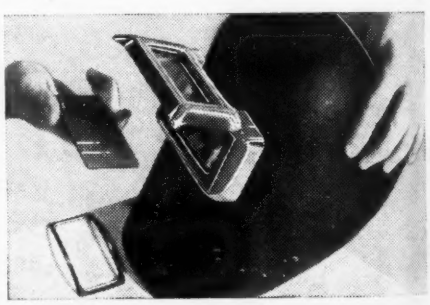
MARKED

When you see the WW trademark on a Willson-Weld lens, it's your assurance of dependable eye protection for welders. The shade number on each lens, determined by individual photometer test, permits easy selection. Never take a chance on unidentified welding glass.



MATCHED

The WW also means that for either goggles or helmets, Willson-Weld lenses are matched to Federal specifications for reducing intensity and glare of visible light and filtering out dangerous ultra-violet and infra-red rays.



REPLACEABLE

Replaceable clear cover glasses protect Willson-Weld lenses from pitting. Lens and cover glass economical to replace. Lens easily changed for different types of welding.

For welding eye protection consult your Willson distributor or write direct to Dept. CA-8.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

PRODUCTS INCORPORATED

READING, PA. U.S.A.

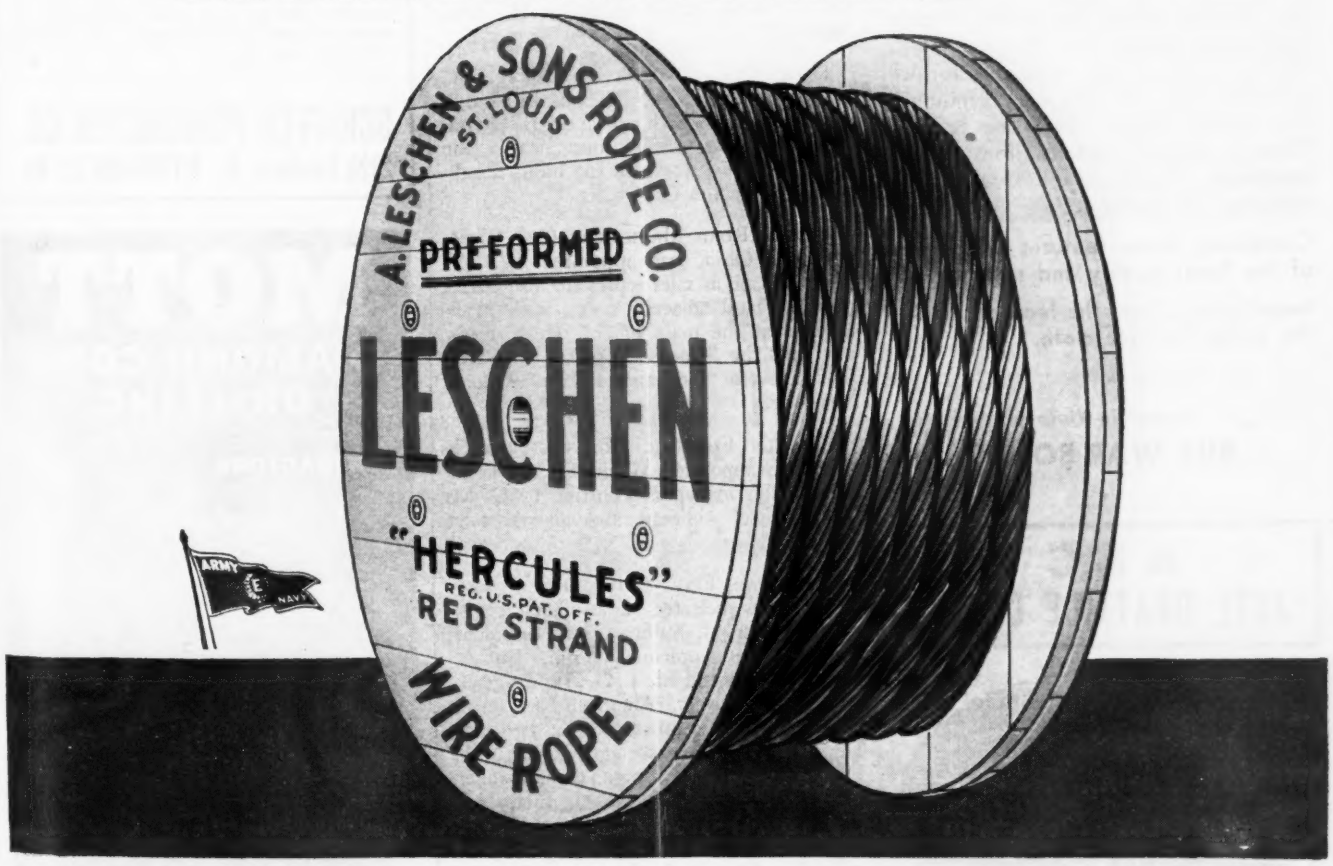
In Preformed, too...

IT'S "HERCULES" Red-Strand

Strength, endurance and ability to resist wear, tear and bending stresses are the fundamental qualities of every "HERCULES" **(Red-Strand)** Wire Rope. It has been serving the various industries for more than half a century.

For many purposes a Preformed wire rope is the most efficient. If your work requires this type of rope, you will make no mistake if you let the **Red-Strand** be your buying guide. Preformed "HERCULES" is available in both Round Strand and Flattened Strand constructions. In this one grade you can obtain a correct type of rope for every heavy duty purpose.

Advantages of Preforming: **It makes for easier, quicker and safer handling... it shortens "breaking in" time... it spools better on the drum ... as the wires and strands are shaped to the normal form they will occupy in the rope, there is less turning and twisting of the rope in the grooves, and less internal movement of the wires and strands—all of which reduce both external and internal wear.**



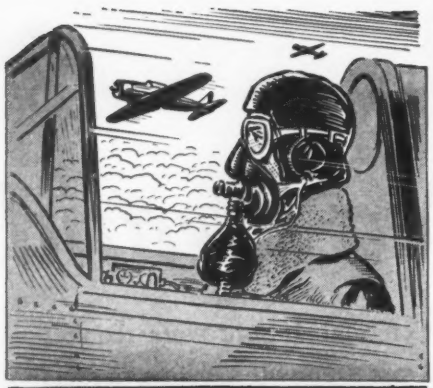
MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK	90 West Street	SAN FRANCISCO	520 Fourth Street
CHICAGO	810 W. Washington Blvd.	PORTLAND	914 N. W. 14th Avenue
DENVER	1554 Wazee Street	SEATTLE	3410 First Avenue South



They've Got to Have AIR

Up in rarified atmosphere, sufficient oxygen is most vital to the crews of our planes. To insure an adequate supply, all planes are equipped with oxygen tanks so that at all times our flyers can have ample oxygen and thus be able to perform at greatest possible efficiency.

For greater safety and more efficient ventilation, specify ABC Brattice Cloth. Flame, water, fungus, and abrasion will not harm it . . . passing cars or machinery cannot pull it down or tear it. Closely woven construction insures maximum wear-resistant quality and minimum air-leakage.

Combined, these features assure you of the finest quality and results.

Investigate . . . get the facts on ABC—the better brattice cloth.

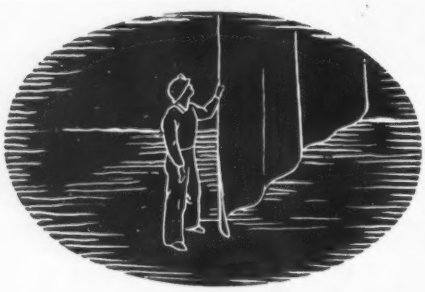
•

Invest in Victory

BUY WAR BONDS

•

ABC
JUTE BRATTICE CLOTH



AMERICAN
BRATTICE CLOTH CORP.
WARSAW - INDIANA

that will permit doubling present production of the heavy-duty Model L diesel. A part of the increased production will go to the railroads for installation in new switching locomotives and the remainder will be employed in other fields, including mining equipment.

Foote Bros. Gear & Machine Corp., Chicago, has elected these officers: L. F. Campbell, vice president in charge of manufacturing, precision gear division; R. B. Moir, assistant vice president in charge of sales engineering, industrial gear division; E. A. Johnson, assistant vice president in charge of manufacturing, industrial gear division; I. C. McVicar, assistant secretary; L. J. Malina, assistant treasurer.

Centrifugal & Mechanical Industries, Inc., St. Louis, Mo., has added to its engineering staff P. W. Bigley, formerly preparation manager for the Central State Collieries, Inc., and the Little Sister Coal Corp.

National Battery Co. has elected Richard H. Rowland as vice president in charge of its Gould Industrial Division, Depew, N. Y. He succeeds H. G. Barnes, who recently became vice president in charge of sales of National and all its divisions, with headquarters in St. Paul, Minn.

Hood Refining Co., Greensburg, Pa., has appointed R. W. Piper as Pittsburgh district manager with offices in the Pennwood Building, Wilkinsburg. For the last 17 years he was with the industrial division of the Sun Oil Co.

Euclid Road Machinery Co., Cleveland 17, Ohio, has appointed W. W. (Bud) Paape as sales representative, covering Ohio and adjacent states, with headquarters at the main office. He formerly was with the Syracuse Supply Co., Caterpillar Tractor Co. and LaPlant Choate Mfg. Co.

Lincoln Electric Co., Cleveland 1, Ohio, has appointed W. R. Persons as assistant sales manager, reporting to C. M. Taylor, vice president and general sales manager.

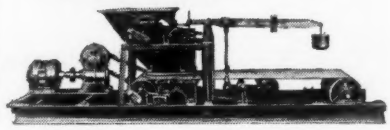
Chemical Fire Extinguisher Association has reelected these officers: president, Arthur G. Sullivan, vice president, Buffalo Fire Appliance Corp., Buffalo, N. Y.; vice president, J. O. Binford, general sales manager, American-La France-Foamite Corp., Elmira, N. Y.; treasurer, Herman W. Diener, secretary, George W. Diener Mfg. Co., Chicago; commissioner, W. J. Parker, W. J. Parker, Inc., New York City. Directors reelected are: George H. Boucher, general sales manager, Pyrene Mfg. Co., Newark, N. J., and E. A. Warren, vice president, General Detroit Corp., Detroit, Mich.

Wickwire Spencer Steel Co. has elected A. G. Bussmann vice president in charge of sales. Previously he was assistant to the president.

Rome Cable Corp., Rome, N. Y., has accepted the resignation of Charles A. Scott as executive vice president and director of sales. He was one of the original

Here is an Automatic Coal Preparation System

A Feeder, Weigher and Conveyor—all in one unit!



The SCHAFFER Poidometer proportions, weighs and conveys coal—according to the desired proportions—automatically and with a high degree of accuracy. Just set it to deliver the mixture and weight you want, and then forget it. The SCHAFFER Poidometer does the rest! Write for Catalog #8 for full information.

SCHAFFER POIDOMETER CO.
2828 Smallman St., PITTSBURGH 22, PA.

MOTT
DIAMOND CORE DRILLING
CONTRACTORS

Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts . . . ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

Cut Material-handling Costs *with this NEW CLUTCH*

Shovels, cranes, hoists and draglines, equipped with the Fawick Airflex Clutch, are more dependable, more productive machines. They are free from the troubles of conventional clutches, with their resulting idle time and added costs.

The FAWICK Airflex Clutch

... saves TIME, space, maintenance and repairs. It has no arms, toggles or springs—needs no lubrication or adjustments—controls power and torque by air—absorbs shocks and vibration.

Proved by the Navy under battle conditions and on heavy-duty drives throughout industry.

Fawick Engineering Department will gladly give you recommendations and further details.

FAWICK AIRFLEX COMPANY, INC.
9919 Clinton Rd. · Cleveland 11, Ohio

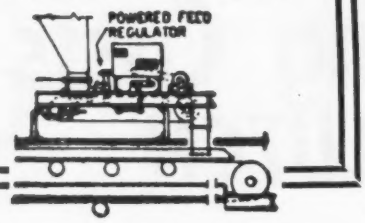
In Canada, **Renold-Coventry Ltd., Montreal, Toronto, Vancouver**

In Britain, **Crofts Engineers, Ltd., Bradford, England**

FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

MERRICK



FEEDOWEIGHT

Accurately Feeds and Records by Weight

Look into this method of feeding coal to a mixing conveyor.

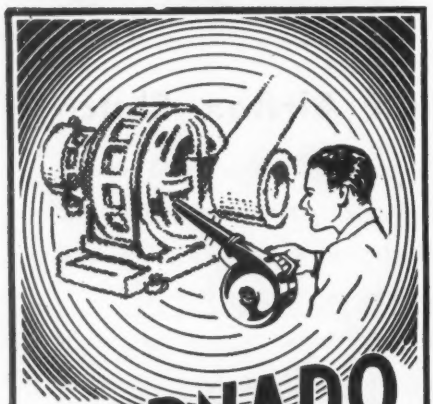
A powered feed regulator controls the feed gate. A visible balance indicator shows true balance for correct rate of feed, while the weight totalizer keeps an accurate record of the day's tonnage.

Investigate this sturdy, dependable equipment for controlling and recording by weight.

Write for Bulletin 551.

Merrick Scale Mfg. Co.

Passaic, N. J.



TORNADO

PORTABLE ELECTRIC BLOWER

reduces DUST DANGER

BLOWS clean, dry air, at 295 m.p.h. Cleans out motors, generators and hard-to-get-at places—removing dust, dirt, lint and chips. Costs less than 3c an hour to operate. Reduces damage to motors and bearings—lessens fire and health hazards.

1 H.P. universal G.E. motor. Weight, 14 lbs. Portable to any place in plant. Plugs in at convenient outlets. Adaptable as Sprayer for spraying paint and insecticide. Convertible into powerful industrial Vacuum Cleaner—for cleaning floors, walls, ceilings, etc.

Free Trial—Write to

BREUER ELECTRIC MFG. CO.
5098 N. Ravenswood Ave., Chicago 40

TORNADO

group in the formation of the company in 1936 and had been head of the sales department since. Glenn E. Rolston, who has been with the company since its start in the capacity of chief engineer, has been appointed sales manager.

INTERNATIONAL HARVESTER CO., Chicago, reports that M. F. Holahan has ended his service as first vice president after 50 years with the company and one of its predecessors. He will remain as a member of the board of directors and be available in a consulting capacity. J. L. McCaffrey, second vice president, will succeed him as first vice president. W. E. Worth, former vice president in charge of supply and inventory, succeeds Mr. McCaffrey as second vice president. Mercer Lee, former assistant to the vice president, has been elected vice president and will be in charge of supply and inventory. Peter V. Moulder, general manager, motor truck division; R. P. Messenger, general manager, farm implement division, and Ralph C. Archer, general manager, farm tractor division, have been elected vice presidents, and will continue as executive heads of their respective divisions.

W. G. KERR CO., representative for Reeves variable-speed control units in western Pennsylvania, will have offices at 520 Oliver Building, Pittsburgh 22, Pa., after April 20.

BUFFALO FORGE CO., Buffalo, N. Y., has appointed Charles C. Cheyney as sales manager. For a number of years he represented the company in Chicago and in recent years has been assistant sales manager.

ELLIOTT CO., Jeannette, Pa., has appointed H. S. Pahren as plant manager, Ridgway division. Joining the company in 1928, he was connected with the Kansas City, Omaha, Tulsa and St. Louis offices before becoming sales manager of the Ridgway division in 1941. F. E. Millan succeeds him in the latter capacity, after having been field engineer at Detroit and then engaged in market research on the company's electrical equipment.

GOULD STORAGE BATTERY CORP., Depew, N. Y., has signed a contract with the Pressed Steel Car Co., Inc., whereby the latter will act as exclusive agent for the export of Gould industrial storage batteries. The arrangement covers all parts of the world except Canada.

A. D. COOK, INC., Lawrenceburg, Ind., has appointed Robert W. Slee as general sales manager in charge of all pump, strainer and ejector divisions of the firm.

•

Trade Literature

COAL CRUSHERS—Jeffrey Mfg. Co., Columbus, Ohio. Catalog 784, covering complete line of crushing equipment for all mines and industries using coal, shows types, sizes, capacities, space required and complete range of product sizes.

SHEAVES—Vulcan Iron Works, Wilkes-Barre, Pa. Bulletin A-396, on Vulcan "Allcasteel" sheaves, cites their three im-

QUALITY MARLO PACKING

METALLIC & SEMI-METALLIC

PACKING

for

MINE PUMPS

"The Packing that gets the Repeat Orders"

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE METALLIC PACKING**

Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST" SEMI-METALLIC PACKING**

Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressibility. Never hardens. For temperature up to 550° F.

• **"RED WATER" SEMI-METALLIC PACKING**

Most modern development for all hydraulic applications. A solid - packing vegetable fibre combined with metal strands. Retains form under any conditions.

Let us serve you

THE MARLO COMPANY

38 HOWARD ST.
NEW YORK, N. Y., U. S. A.

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—with diamond whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO

WEDGE WIRE SCREENS

Custom Built to fit your processing needs

Formerly manufactured in England, Wedge Wire coal preparation screens are now American-owned and "Made in America". Wedge Wire Screens are the popular choice of many coal plants and they're giving long, money-saving performance all over the country. These screens are built to exactly fit your plant needs—made of a variety of materials; brass, bronze, aluminum, copper and stainless steel. Whatever you need in coal processing screens, there is a Wedge Wire Screen to economically do the job. Write our engineers today for complete information on specifications for these screens.

MANUFACTURERS OF PREPARATION SCREENS . . . . . .

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ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations, and Reports of Mining Properties Equipment and Operation.
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30 Years
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To Yield Maximum Net Returns
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L. E. YOUNG
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MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

portant operating advantages as greater safety, lower power consumption and longer rope life.

ENGINEERING SUPPLIES—Colonial Supply Co., 217 Water St., Pittsburgh 22, Pa. Catalog gives 800 pages of engineering and detail information on more than 20,000 items for all classes of industrial, contracting and mining operations.

STEEL-PLATE FABRICATION—Downingtown Iron Works, Downingtown, Pa. Catalog 102 describes the company's facilities for handling unusual and difficult fabrication problems, picturing numerous examples of its work.

COUPLINGS—Link-Belt Co., 307 North Michigan Ave., Chicago. Book 2045, on a complete line of shaft couplings, gives sizes, dimensions and list prices for couplings of flexible, rigid flanged face and compression types, with special emphasis on the Type RC roller chain type. Detailed information also is given on protective casings for the RC coupling. This includes two styles of revolving casings (R and P) and Type S stationary mounted casing. The Type P is a plastic casing; the others are made of steel.

EYE PROTECTION—Willson Products, Inc., Reading, Pa. Bulletin describes the Willson Mono goggle, said to combine light weight with shatterproof eye protection, made possible by plastic materials with improved fabricating techniques.

VARNISHES—Dow Corning Corp., Midland, Mich. Booklet describes the properties of DC 993 varnish and outlines the recommended procedures in applying this Silicone product to the insulation of electrical equipment.

FLEXIBLE METAL HOSE—Packless Metal Products Corp., New Rochelle, N. Y. Data file on the installation of flexible metal hose has over 60 pages of halftones, specifications and line drawings developed out of the experience of Packless field engineers to show the correct installation practices for getting maximum serviceability out of hose. Section shows how to assemble detachable self-sealing hose couplings and self-flaring fittings for copper and plastic tubing right at the job. Complete Packless line of hose constructions is illustrated and described.

INDUSTRIAL COATINGS — Carbozite Corp., Pittsburgh 22, Pa. Booklet lists each type of coating manufactured by the company, with definite and detailed information on their proper application.

WIRE-ROPE CLIPS—American Hoist & Derrick Co., St. Paul, Minn. Booklet CCB-11B gives full details about the Crosby clip and contains a table of the number of clips to use for all sizes of rope up to 3-in. Also instructions, illustrated with diagram and pictures, are given for making a wire-rope fastening properly.

CABLE VULCANIZER—Mines Equipment Co., St. Louis 10, Mo. Bulletin RV-104-K describes cable vulcanizer kit assemblies covering units for vulcanizing jackets of rubber-covered electric cables up to $1\frac{1}{8}$ in. in diameter.

PROTECT COAL CLEANING MACHINERY

with DINGS MAGNETIC SEPARATORS

• Prolong the life of coal cleaning machinery with Dings High Intensity Magnetic Separators. Protect wet and dry coal preparation equipment permanently from costly tramp iron damage. Pulleys, drums, rectangular suspended magnets or any type unit furnished to fit your specific needs. Write today for helpful literature.

DINGS MAGNETIC SEPARATOR COMPANY
506 E. Smith Street
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Dings
HIGH INTENSITY

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH KNIFE & FORGE CO.
1421 Reedsdale St., N.S.
Pittsburgh 12, Pa.

LARGE BITUMINOUS COAL PRODUCERS HAVE GIVEN REPEAT ORDERS FOR.....

CHANCE PROCESS WASHERS

in the past 4 years!

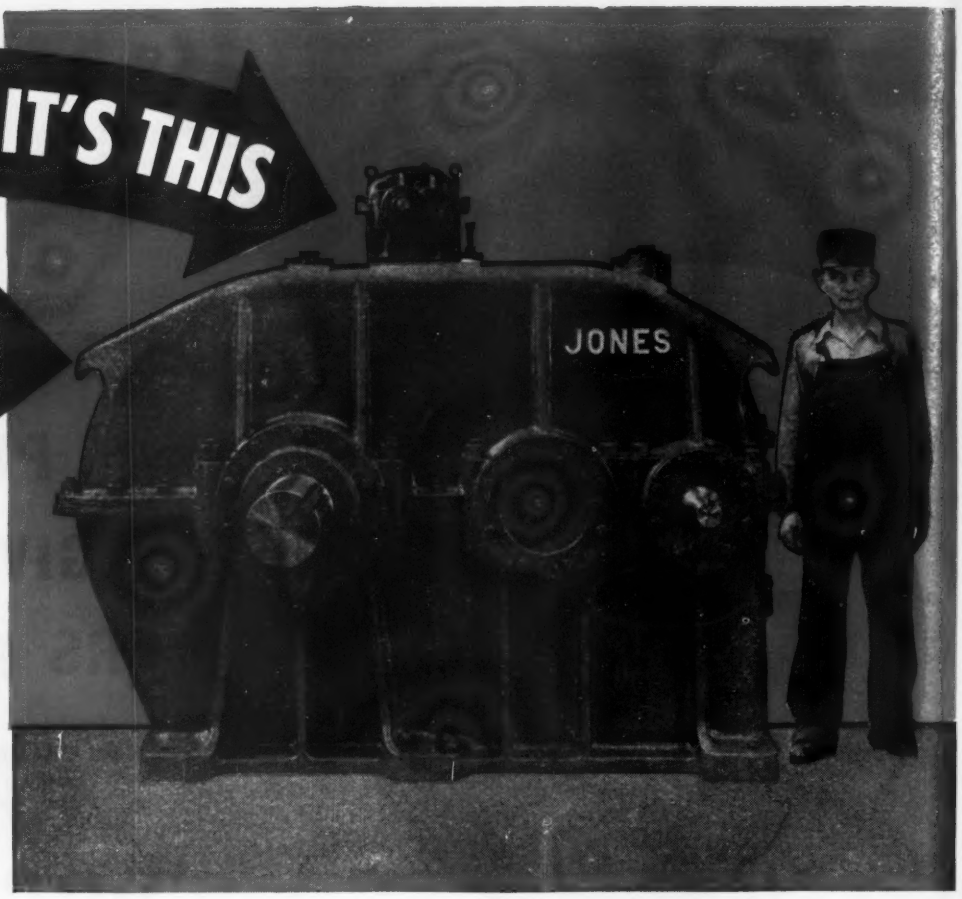
Yes, 7 big users of Chance Flotation Process liked their first Chance so much—they ordered a second!

Repeat orders are proof of Chance operating efficiency and economy in cleaning bituminous coal.

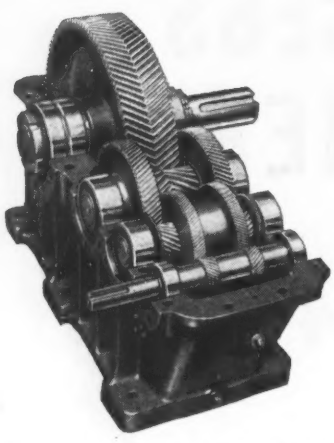
UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK PHILADELPHIA CHICAGO

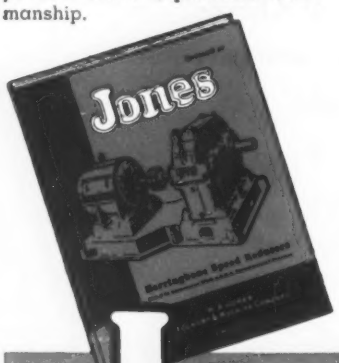
WHETHER IT'S THIS —OR THIS



. . . both will stand up under war time conditions



The above view of a Jones Triple Reduction Herringbone Speed Reducer is typical of a line that is noted for advanced design, superior materials, precision workmanship.



TWENTY FOUR hours a day operation plus loading up to rated capacity or beyond are testing speed reducers in every type of service.

Jones Herringbone Speed Reducers are establishing remarkable service records under these conditions. One reason of course is the fact that Jones Reducers have always been rated in accordance with the recommended practice of the American Gear Manufacturers Association.

With this conservative rating policy goes sturdiness, compactness, symmetry and balance—all factors that influence maximum efficiency, long life and improved performance.

Jones Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1, in ratings from 1.3 to 440 H.P. Double (Type DH) reducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

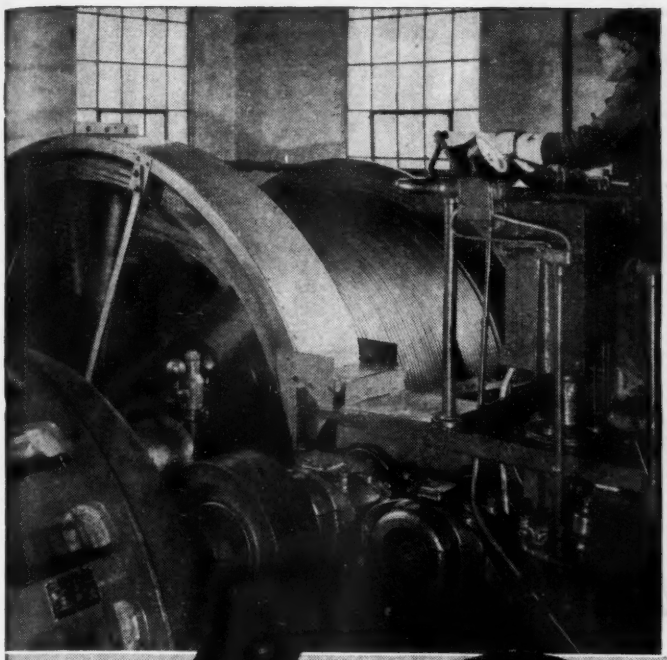
All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly.

For complete information on both standard and special applications of Jones Herringbone Reducers ask for Catalog No. 70. This 128 page catalog is a comprehensive technical treatise on the whole subject of Herringbone Reducer application for all conditions of service. If you have any type of drive problem that might call for Herringbone gears we shall be pleased to send you a copy.

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Road, Chicago, Ill.

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES



above ground

underground

Gulf Quality Lubricants

reduce wear, down time, maintenance costs

GULF QUALITY LUBRICANTS are writing a list of tangible benefits in the operating records of all types of mine equipment—above ground and underground. This "dividend" list includes less wear, fewer shutdowns, lower maintenance costs, and better all-around performance.

You can count on these same dividends when *your* equipment is maintained with Gulf oils and greases. For these quality lubricants have superior lubricating value and longer life—two assets that insure a better protection job. And there's a type and grade for every specific requirement—with over 400 lubricants from which to select, the Gulf Service Engineer never needs to compromise in his recommendations for your equipment.

Gulf quality lubricants—and the helpful counsel of a Gulf Service Engineer—are available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write or phone your nearest Gulf office today.

GULF INDUSTRIAL LUBRICATION

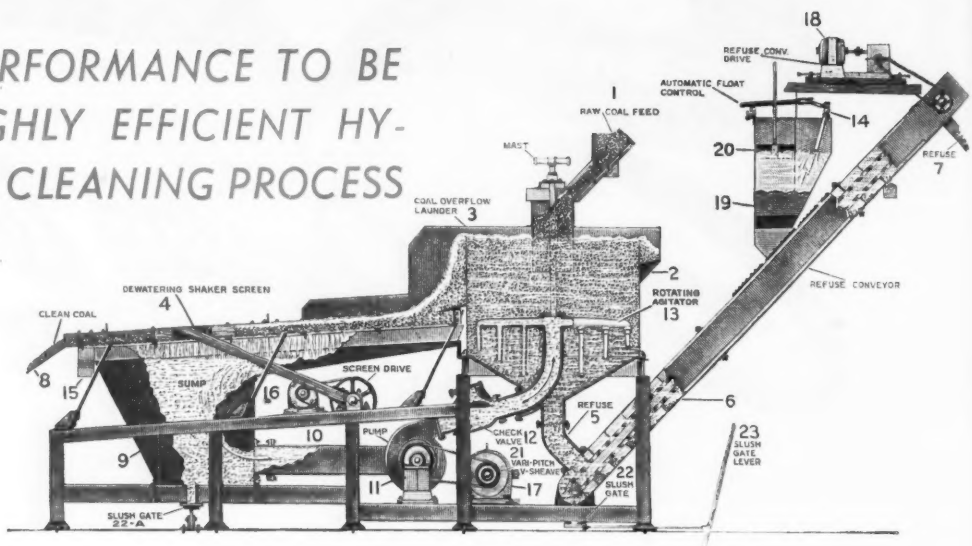
Gulf Oil Corporation · Gulf Refining Company

Gulf Building, Pittsburgh 30, Pa.

MORE THAN 10,000,000 TONS OF ANTHRACITE

WILL BE PREPARED THIS YEAR BY WILMOT W WILMOT HYDROTATORS

PROVED BY PERFORMANCE TO BE THE MOST HIGHLY EFFICIENT HYDRAULIC COAL CLEANING PROCESS



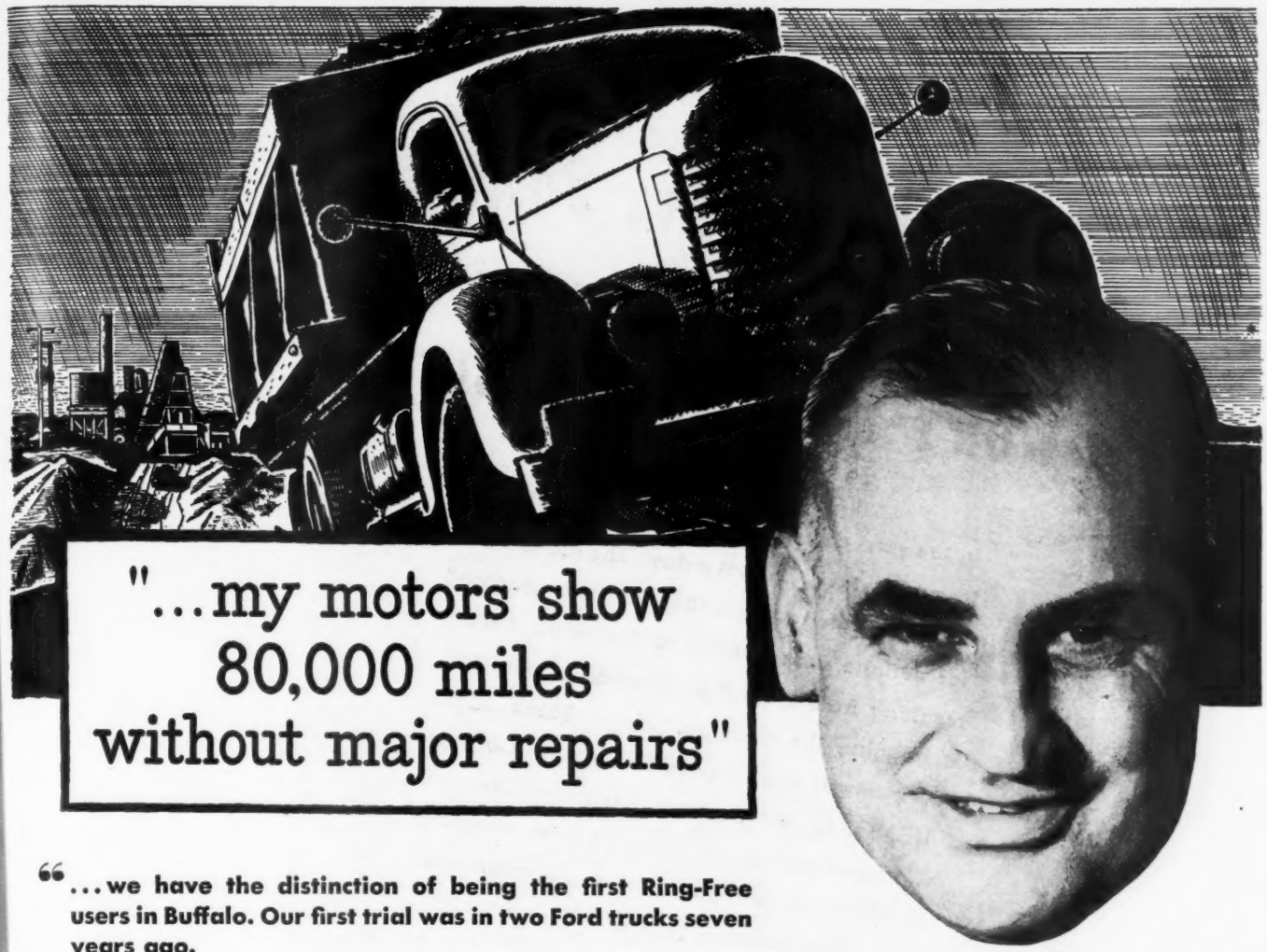
The efficiency of Wilmot Hydrotators is best demonstrated by the large tonnages handled during these days of peak wartime production. In times like these, when speed is of the essence, an efficient coal preparation unit makes an outstanding contribution to the war production goals established by the Anthracite Industry.

In scores of anthracite preparation plants, Wilmot Hydrotators are making it possible to step-up production without sacrificing quality, by providing a preparation process that combines the advantages of *speed, efficiency,* and *economy.*

Exclusive mechanical features give the Wilmot Hydrotator these four definite superiorities: (1) Capacity for handling larger tonnages; (2) Ease of operation; (3) Automatic control; (4) Low operating, maintenance and repair costs.

Write for bulletin HR.

WILMOT ENGINEERING CO., Foundry and Shops: WHITE HAVEN, PA. **HAZLETON, PA.**



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"...we have the distinction of being the first Ring-Free users in Buffalo. Our first trial was in two Ford trucks seven years ago.

...our fleet has increased to fourteen trucks including Autocars, Internationals, Fords and one Chevrolet.

...trucks are all used in hauling sand and gravel...the hardest kind of work on trucks as roads are bad...loads are heavy. Due to conditions there is a constant uneven strain on motor bearings.

...if Ring-Free did not have a tough film strength that protected these bearings my motors would not be able to show 80,000 miles without major repairs as many of them have.

...Ring-Free's ability to penetrate even to the top of the pistons and keep the upper rings free gives my motors all the power they were intended to have.

...my first International truck went 110,000 miles with only $50 repairs...proper lubrication was responsible."

Excerpts from letter of—

George Muehlbauer

George Muehlbauer
205 Courtland Avenue
Buffalo, New York

MACMILLAN RING-FREE MOTOR OIL

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems. ... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

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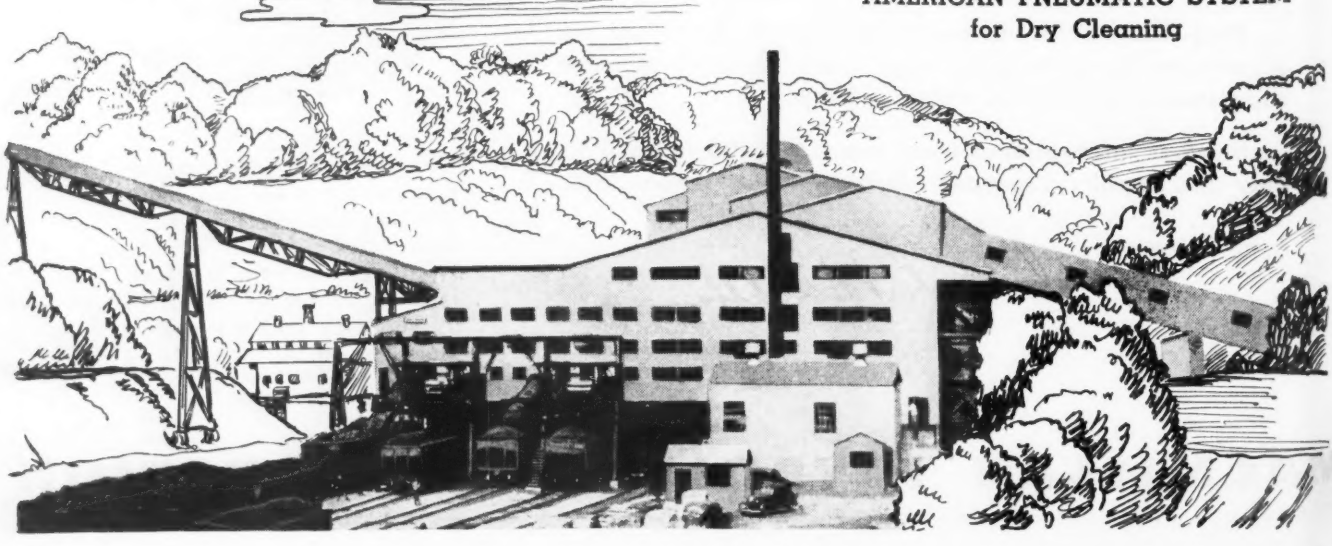
Just TAKING COAL *out of the ground* WON'T MAKE IT SALABLE!

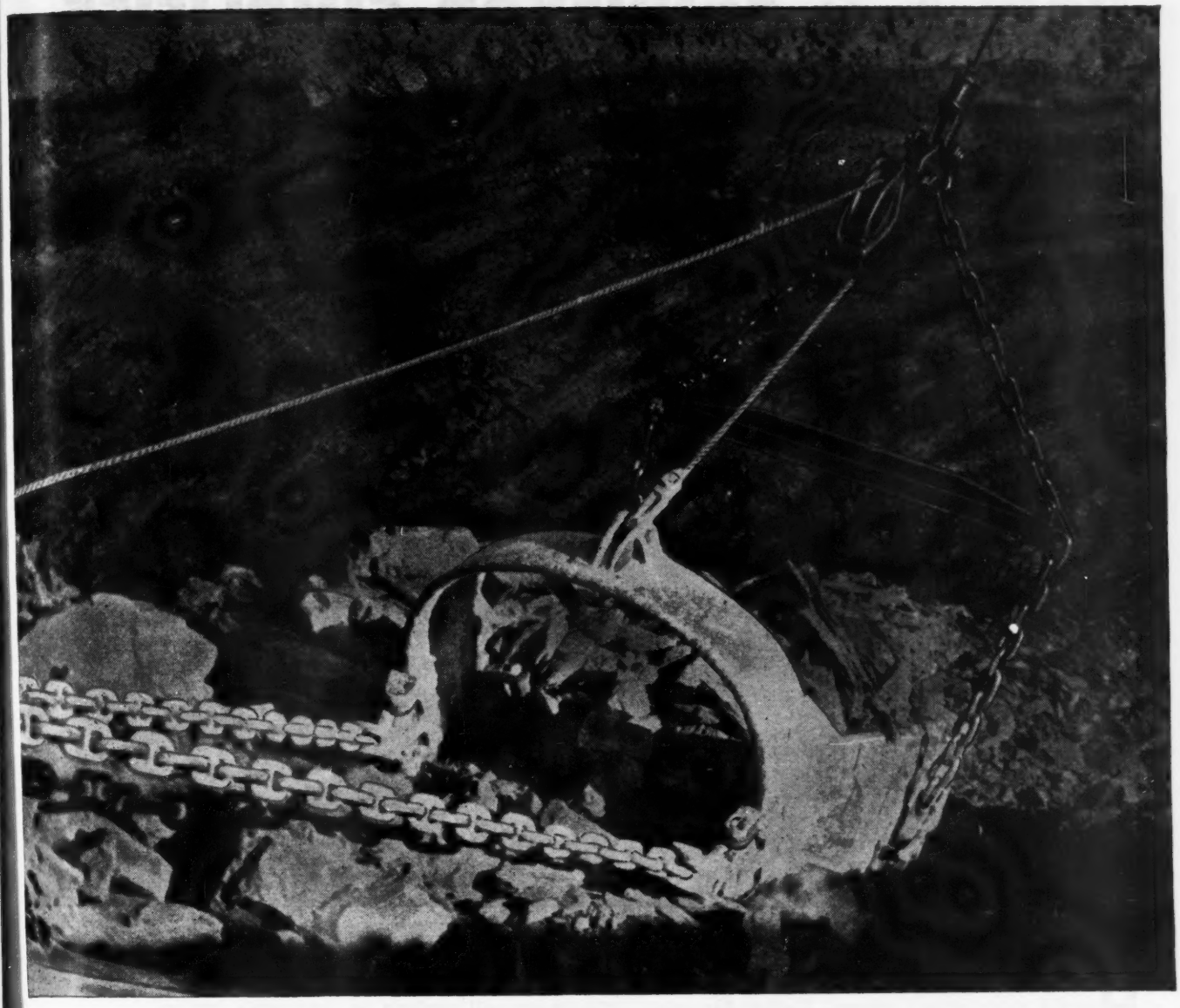
In the past coal could be offered—and sold in its raw state . . . but not today! The market now is concentrated on specification fuel, prepared for definite uses—and it is that extra quality resulting from correct preparation of coal that is bringing the premium prices! Think about your postwar market possibilities now. Consult FAIRMONT. We'll take full responsibility for the improvement of your present washing and blending methods and the construction of complete preparation plants.

FAIRMONT MACHINERY COMPANY
FAIRMONT, W. VA.

CHANCE SAND FLOTATION SYSTEM
for Wet Cleaning

AMERICAN PNEUMATIC SYSTEM
for Dry Cleaning





Coal Strippers Know...You've Got to

TAKE IT OFF!

Results Show Page *Automatics* Are Tops for Uncovering Coal...

Used in more than 90% of the nation's coal stripping operations, Page AUTOMATIC dragline buckets dig through soapstone, shale and blasted rock in record time . . . and yet clean off the coal without tearing it up. Everywhere, it's Page AUTOMATIC-DIGGING-ACTION for increased yardage and reduced maintenance costs!

PAGE

Automatic

DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

HOW A B G CONVEYOR SIMPLIFIES MINE HAULAGE . . .

HERE'S why standardized Barber-Greene sectional conveyor equipment is ideally suited to wide application in your mine:

It is factory-engineered and prefabricated in unit sections and terminals.

It can be moved and reassembled with little labor expense, or loss of time.

It utilizes the advantages and economy of continuous flow transportation.

Conveyor frame sections withstand severe abuse.

Conveyors will conform to reasonable bottom curves.

Frames and terminal units are interchangeable.

Three styles of sections—angle, channel and truss —offer the correct overall height to meet the working condition.

For fast and low-cost transportation from working face to surface, install a Barber-Greene conveyor system. B-G engineers and mine consultants, experienced in mine conveyor operations, are available. Barber-Greene Company, Aurora, Illinois.

BARBER GREENE

AURORA, ILL., U. S. A.

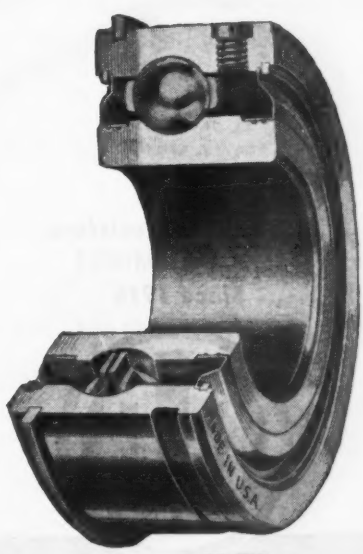
THAT EXTRA SOMETHING...

FOR THE LONG, HARD PULL

IN AN ATHLETE, it is called "STAMINA." In a ball bearing, it is DURABILITY—and it is determined by the inbuilt features that safeguard against wear and break-down.

The NORMA-HOFFMANN "CARTRIDGE" BALL BEARING has all these vital features, developed to the last degree:—wear-less, friction-free, all-metal seals (removable and replaceable) sealing lubricant in and dirt out, regardless of shaft angle; at least double the grease capacity of any other single-row bearing. A design that holds the grease ON THE ROLLING SURFACES, where it is most effective.

Read about these, and other, valuable features of the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING in the Catalog, sent on request. Or, ask our nearest office to have one of our Field Engineers call and explain.



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NORMA-HOFFMANN BEARING CORPORATION

STAMFORD, CONNECTICUT ★ Founded 1911

Field Offices: NEW YORK • CHICAGO • CLEVELAND • CINCINNATI • PITTSBURGH • DETROIT • LOS ANGELES • SAN FRANCISCO • SEATTLE, WASH.

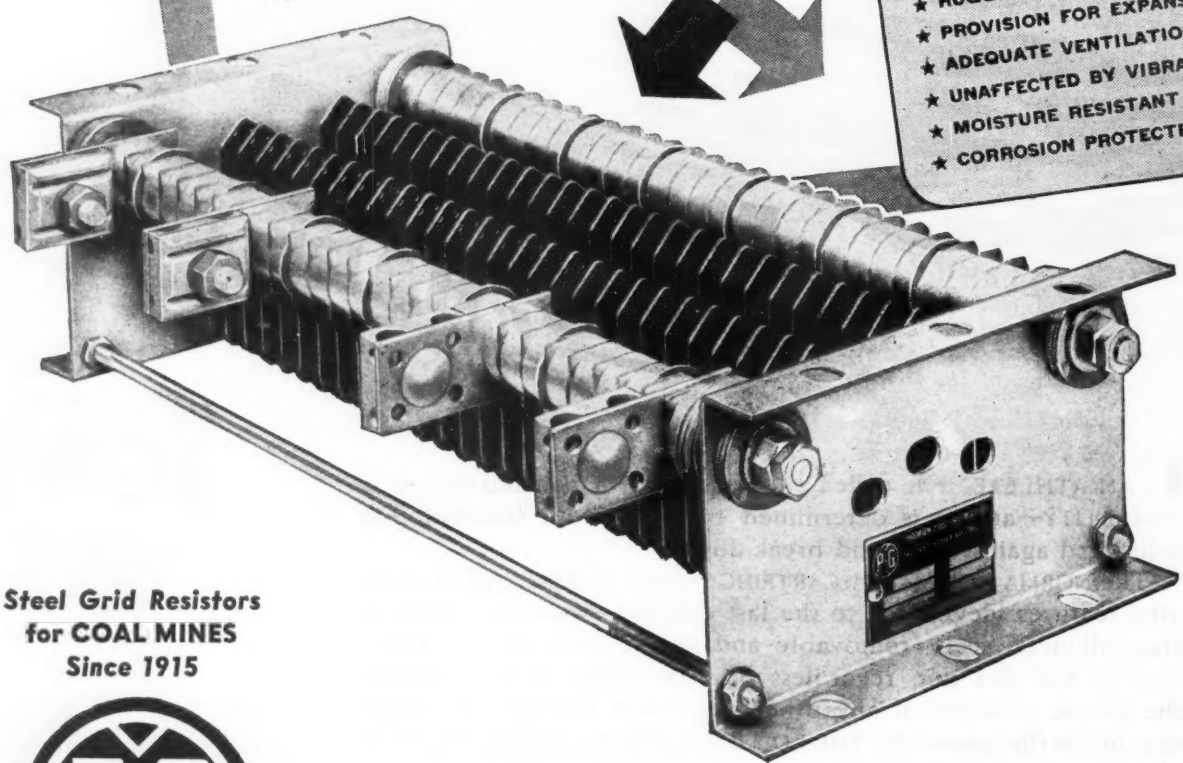
BUILT TO LAST LONGER

where conditions may be *Destructive or Hazardous*

P-G RESISTORS, with their non-corrosive steel resistor elements and mica insulation, last longer under extremely adverse operating conditions. In addition, P-G exclusive floating bolt provision for expansion and allowance for adequate ventilation provide that "something extra" needed for a truly rugged resistor. Neither vibration, nor moisture laden or corrosive atmospheres have material affect on quality of service.

Try P-G Resistors for your toughest job.

- ★ ALL STEEL CONSTRUCTION
- ★ MICA INSULATION
- ★ RUGGED TERMINALS
- ★ PROVISION FOR EXPANSION
- ★ ADEQUATE VENTILATION
- ★ UNAFFECTED BY VIBRATION
- ★ MOISTURE RESISTANT
- ★ CORROSION PROTECTED



Steel Grid Resistors
for COAL MINES
Since 1915

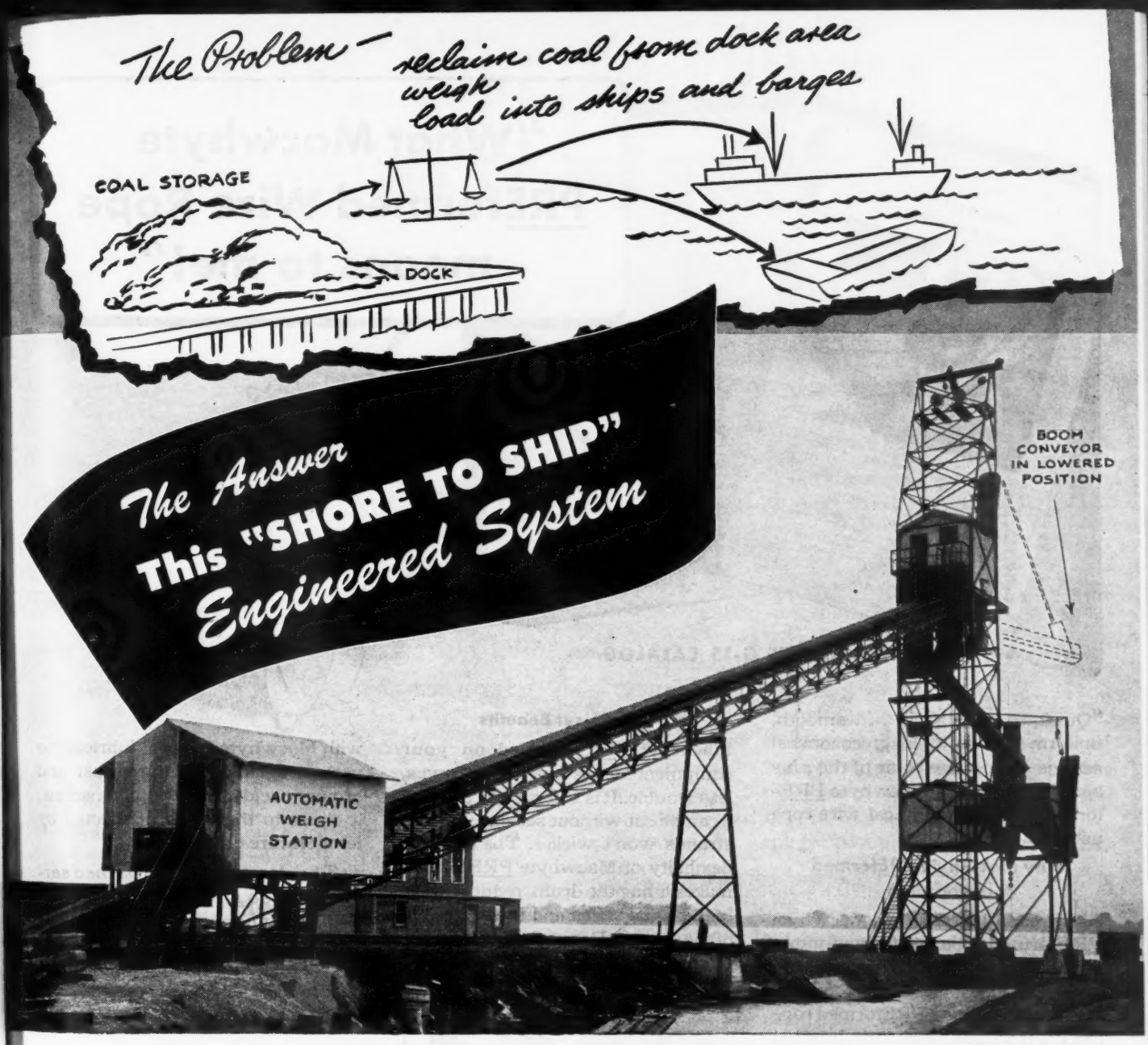
P-G

The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO


The Problem — reclaim coal from dock area weigh load into ships and barges
COAL STORAGE
DOCK
The Answer
This "SHORE TO SHIP" Engineered System
BOOM CONVEYOR IN LOWERED POSITION
AUTOMATIC WEIGH STATION

Weigh station at lower left automatically weighs all coal carried up the S-A Belt Conveyor. A by-pass chute at the tower permits diversion of coal to storage hopper for loading of barges. All belt conveyor carriers are of the S-A SIMPLEX type.

• Automatic weighing of coal before loading into ships and barges was an *added* problem at this dock. The solution was an S-A Belt Conveyor through a tunnel under the coal pile, an inclined belt conveyor with automatic weighing unit and an S-A Boom Conveyor, which is raised and lowered from a tower when loading coal into the holds of vessels.

Although a seemingly simple system, its efficiency is due to many years of S-A engineering experience behind the design.

Write us for suggestions and recommendations regarding *your* coal handling problems.

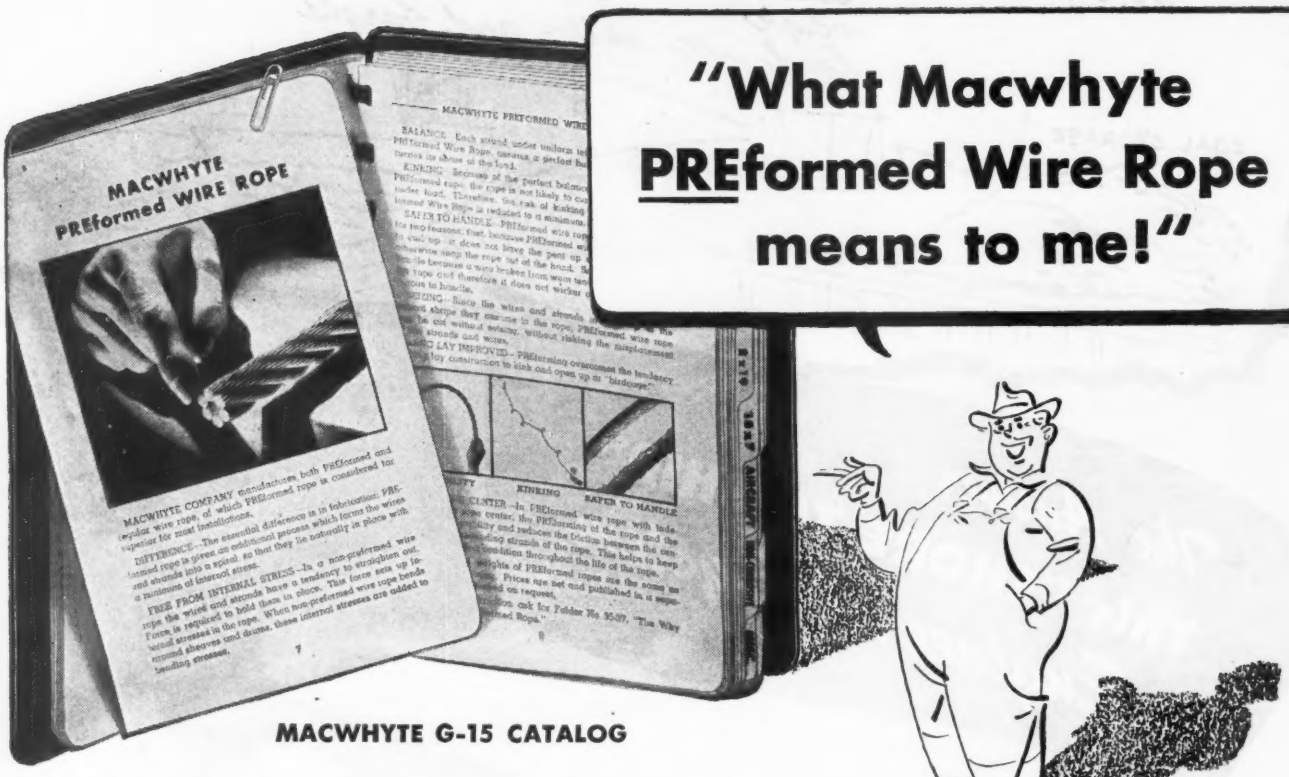
STEPHEN S-A ADAMSON MFG. CO.

2 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

"What Macwhyte PREformed Wire Rope means to me!"



MACWHYTE G-15 CATALOG

"Quick, easy handling . . . smooth, uniform spooling . . . long, economical service — those are some of the *plus* benefits I get from Macwhyte PREformed," says the typical wire rope user.

Why Macwhyte PREformed is preferred

All wires and strands in a Macwhyte PREformed rope are formed into a spiral, so that they lie naturally in place. Because it is free from internal stress, a Macwhyte PREformed rope has great fatigue resistance. Internal friction caused by wires and strands moving against each other is sharply reduced, resulting in a minimum of internal wear.

In Macwhyte PREformed, every strand in the rope is under uniform tension. There is no "early" wearing out of some strands while others "loaf." The perfect balance of strands makes Macwhyte PREformed exceptionally kink resistant.

Other User Benefits

Macwhyte PREformed on your equipment means fewer shut-downs, less trouble. It is safer to use because it can be cut without seizing—broken strands won't wicker. The extreme flexibility of Macwhyte PREformed makes it hug the drum, reduces wear both on the wires and in the groove of the sheave. Because of its long life, Macwhyte PREformed gives lowest possible cost per load carried.

All this, and Macwhyte Internal Lubrication, too!

Every wire in every strand of Macwhyte PREformed rope is coated with Macwhyte internal lubricant to protect against moisture, rust and ordinary acids. Heavy and tenacious, it clings to the wires unaffected by temperature changes.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day, so please keep trying. We'll serve you if we possibly can.

MACWHYTE PREformed WIRE ROPE — **Plus** Internal Lubrication, Selected Steels, Tested-Proved

The correct rope for your equipment

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A:

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

MAKE SURE NO CHIMNEY keeps you out of any post-war home!

Skimpy chimneys threaten your future fuel business . . . Join the *nation-wide* campaign for Adequate Chimneys!

• One of these days, post-war homes will be springing up along the streets of your community. And —unless you do everything possible to prevent it —you and your Bituminous Coal business may be shut out of most of those post-war homes forever. It can happen if those homes are built with chimneys *too small* to burn Bituminous Coal.

And today many a post-war house is being planned just that way! What will happen? The future of your fuel business will be threatened. And the long-range value of the post-war house —built to last at least two generations—will be endangered. That's because nobody knows how long the supply of other-than-coal fuels may last, or how long these other fuels will remain at a price level that permits their use for home heating. Conversely, Bituminous Coal will remain the lowest-cost fuel for many generations. Thus, *no new home should be built without a chimney big enough to burn Bituminous Coal.*

The Bituminous Coal Institute is giving you strong support. A campaign in *American Home*, *Better Homes & Gardens*, and leading architectural and building magazines is under way. Throughout the country, home-planners are being sold the importance of building Adequate Chimneys . . . chimneys big enough to burn Bituminous Coal.

You can defeat this danger!

By "selling" Adequate Chimneys to your community, you'll (1) protect the future of your business; (2) render a community service; (3) add to your business prestige.

Write us for the eight major methods that sell the importance of Adequate Chimneys to your community. Find out exactly who to contact . . . how to win their support. Also ask for a sample of the consumer material which will help you to do the job. Sign the coupon below . . . win coal customers in post-war homes.

BITUMINOUS COAL INSTITUTE, 60 EAST 42ND STREET, NEW YORK 17, N. Y.

BITUMINOUS COAL INSTITUTE
Department J.
60 East 42nd Street, New York 17, N. Y.

You say I can protect my future coal business? O.K.! Send me full information—and send it quick!

Name_____

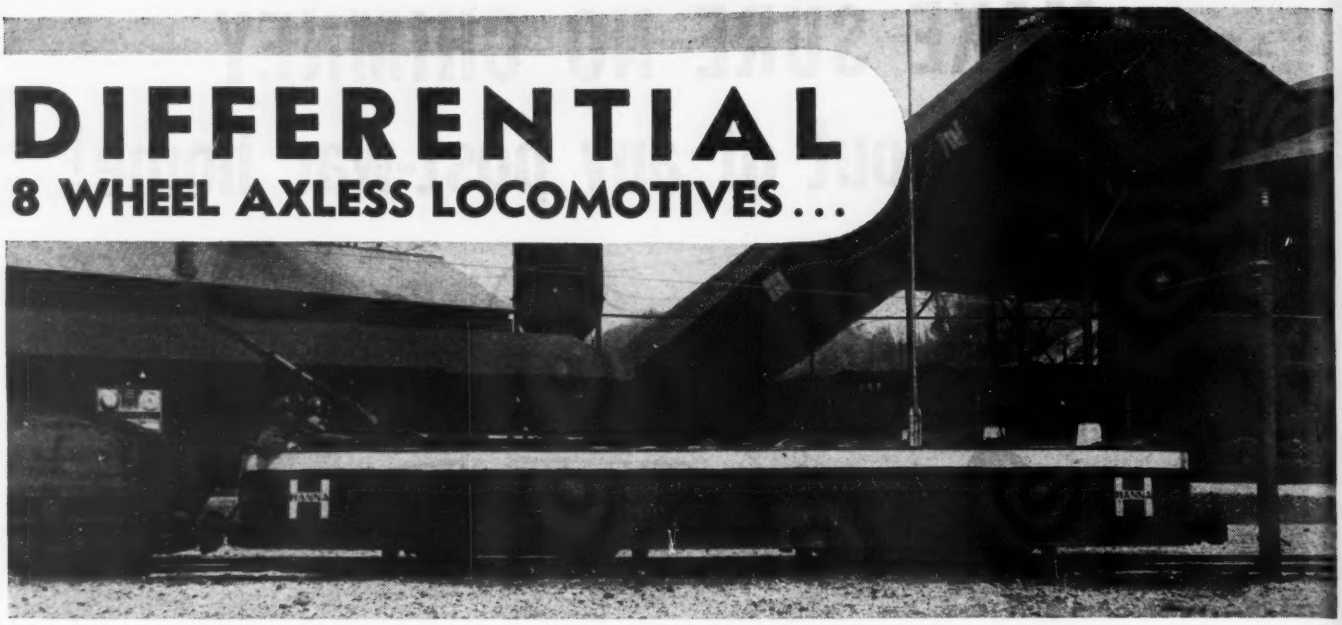
Company_____

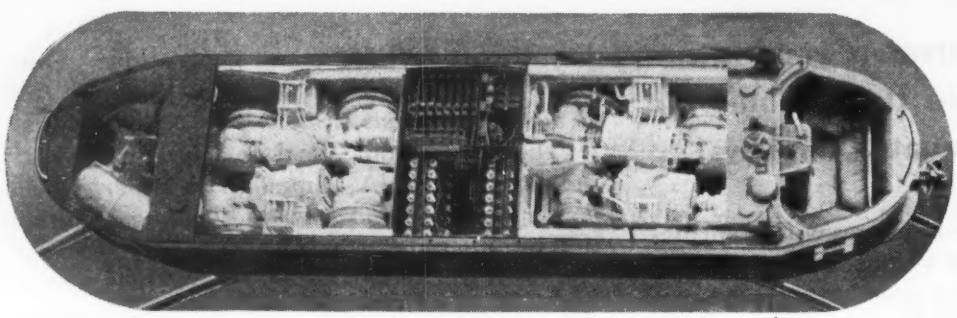
Address_____

City_____ State_____

(NOTE: This advertisement is one of a series appearing in coal dealer publications. If you would like more information about this campaign, write to the above address.)

DIFFERENTIAL
8 WHEEL AXLESS LOCOMOTIVES . . .

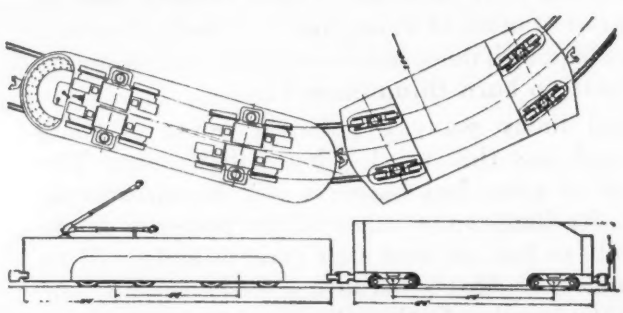


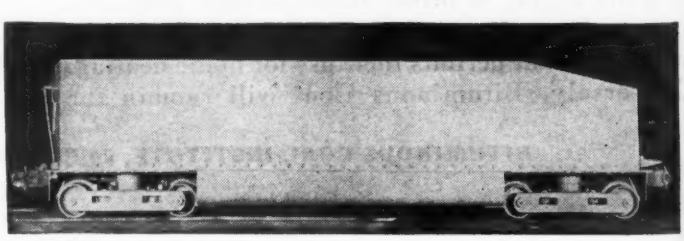


Plan View . . .

shows 21-ton Differential AXLESS locomotive on a 25-foot radius curve — notice compact design and accessibility for easy maintenance.

• Differential 360 HP 8-wheel AXLESS locomotives provide ample power for hauling larger trains—faster—at lower cost. These streamline heavy duty locomotives have more adhesion available for tractive effort and braking due to tandem drive corrective for transfer of weight. There is no connection between wheels on one rail and wheels on the other, therefore, in negotiating a curve there is no slippage caused by difference in wheel travel. By eliminating this slippage, adhesion between rail and wheel is unbroken and there is no drawbar pull loss. This modern AXLESS truck locomotive provides greater traction—power on all eight wheels—smooth riding—thus enabling it to haul heavy loads at high speeds in safety. Full anti-friction bearings and gears operate in a bath of oil sealed away from dirt.





Large Differential mine cars with patented 8 wheel AXLESS trucks provide greater carrying capacity within a limited height—require fewer cars and less maintenance. Smooth riding reduces spillage on haulage ways and assures safety at higher speeds. Less cost per ton—more tons per shift.

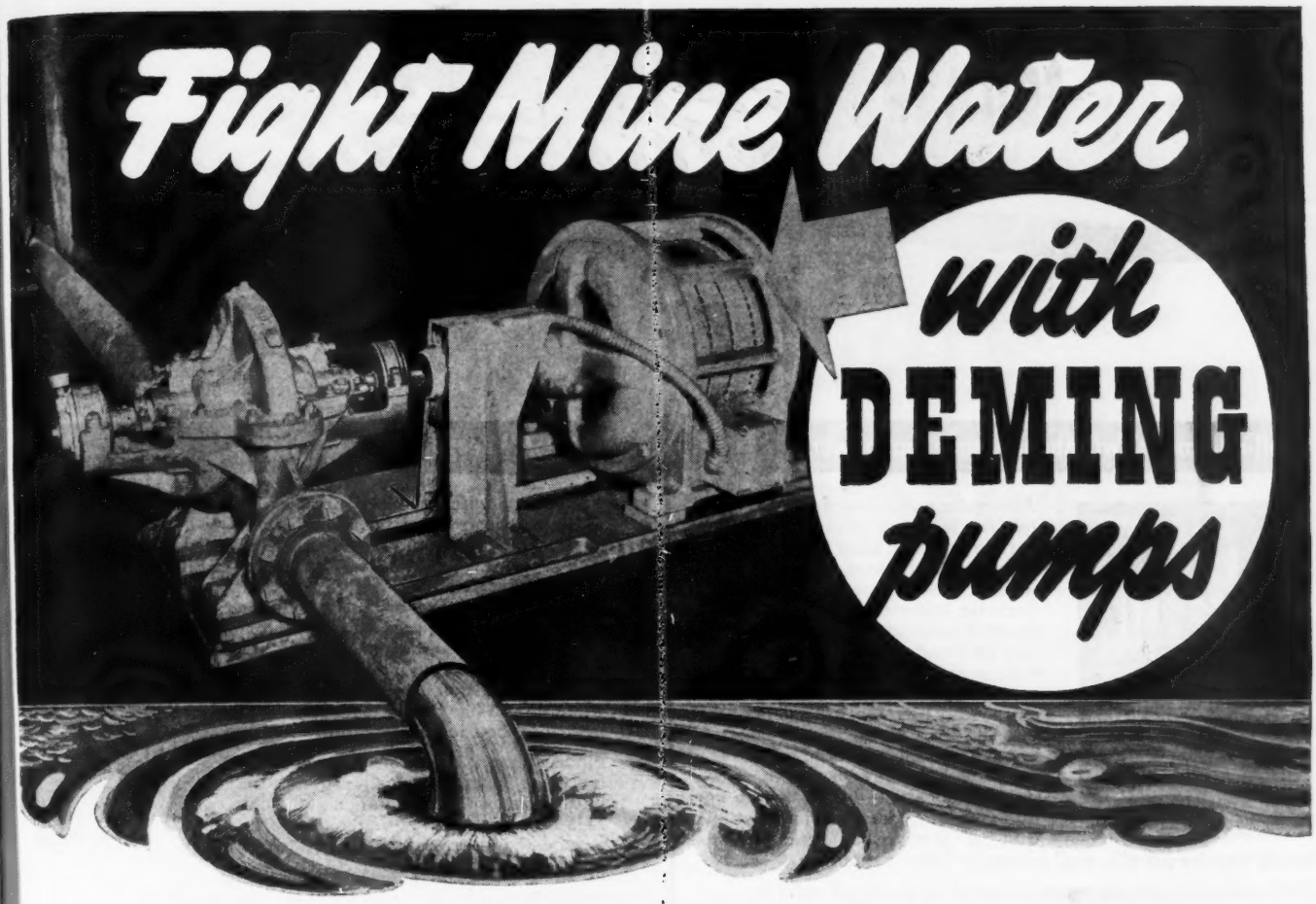
DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS

Fight Mine Water with DEMING pumps



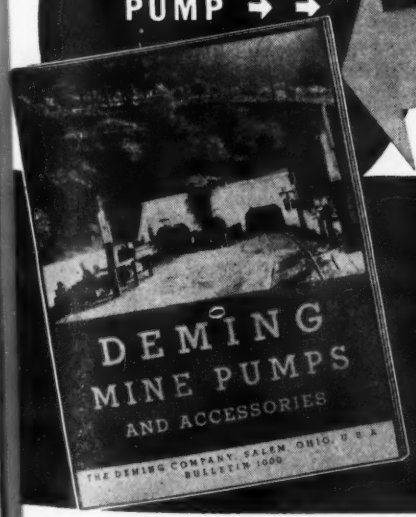
MINE WATER IS A FIFTH COLUMNIST. It takes FIGHTING PUMPS to keep it out! Deming Mine Pumps are built to do that job—thoroughly, economically, and dependably.

An example is the Deming Pump illustrated. It's a heavy duty, hard-boiled fighter, tough as a U. S. Marine in action. Its job is to handle mine drainage water of high acid content.

To do that job with unfailing performance, this particular pump has a bronze casing and chrome impellers. Corrosion resisting pipe is used to cooperate with the acid resisting pump.

YOUR particular mine dewatering needs may not call for as tough a fighter as that pump. But somewhere in the Deming line is *the right pump for YOUR specific needs.*

SEND FOR THIS FREE GUIDE TO THE RIGHT PUMP →→



Here's what the FREE Guide covers:

Bulletin 1000 contains large illustrations of various types of Deming Mine Pumps, sectional views showing features of construction, performance tables on all types and sizes of pumps, technical data, detailed information about accessories and other helpful data. Send for FREE copy of Bulletin 1000.

Use this convenient form for quick action!

THE DEMING COMPANY · SALEM, OHIO

★ Send me a copy of FREE Bulletin 1000.

NAME_____

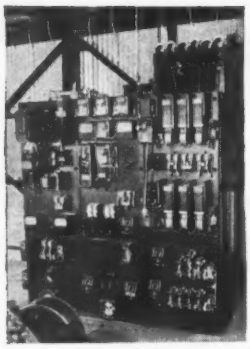
ADDRESS_____

_____

CA-4

tonnage Boosters

Full-automatic switchboards save manpower



Automatic switchboards for service with M-G sets and rotary converters are controlled by clock or remote push-buttons. Operating without attendance, except for periodic inspection and maintenance, automatic switchboards can be situated to provide good voltage at the working face. They are so designed by I-T-E that they can readily be relocated and kept close to load underground centers. A complete switchboard is assembled quickly in any convenient location by fastening free-standing frames together with a few bolts. Standard boards require no sills, wall braces or other supports.

I-T-E automatic controls protect against all electrical emergencies met with in mechanized mining operations. These include low a-c voltage with automatic restart, a-c overload, converter field failure, phasing faults, incomplete start, reverse current or polarity conditions, d-c short circuit and d-c overload.

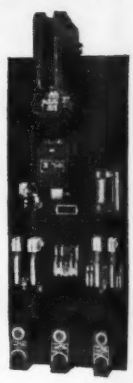
Illustrated is a typical three-panel board of standard height.

Sectionalizing gives steadier production

Type KSC automatic reclosing circuit breakers are used in mechanized mines to prevent interference between sections. Trolley and feeder disturbances are limited to the areas in which they originate and distant stations cannot feed into a faulted section. Improved voltage conditions which sectionalizing assures keep losses of production time to a minimum. Maintenance on mining and loading machines is reduced since the equipment is not called upon to operate on abnormally low voltage.

Illustrated is a Type KSC sectionalizing circuit breaker for installation underground. The steel enclosure, shown open, not only protects the operating mechanism but also aids in permitting the circuit breaker to be quickly installed and easily relocated for best protection of the system.

"KSA" keeps power flowing



Frequency with which overload peaks and faults arise on long trolley systems calls for means of reducing outages to shortest periods. The Type KSA automatic reclosing circuit breaker was designed specifically for this purpose. It opens the circuit when opening is necessary and restores service automatically as soon as line conditions warrant. Ability to measure line conditions is inherent in the device. The circuit breaker "knows" instantly when a fault has been cleared or the load has been reduced to a safe value.

Since action is automatic and the need of attendance reduced, smaller generating units located nearer load centers may be employed. This further improves voltage conditions and reduces cause of outages.

Illustrated is Type KSA for feeder-generator application. It incorporates two means of measuring line conditions (1) measuring the load and (2) measuring voltage difference.

"Distributors" equalize the load

Type LDR Load Distributors make a direct contribution to peak tonnage in mechanized mines by avoiding frequent opening of circuit breakers, particularly those outages arising from unequal distribution of load among widely separated substations operating in parallel. Loads on either M-G sets or rotary converters are kept in balance by automatic transfer under peak conditions. Not only is overheating with resulting outages reduced but necessity of maintenance is greatly lessened. Illustrated is the standard, panel-mounted device.

Distant trolley circuits protected

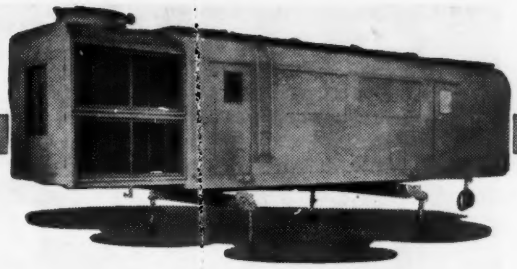
Type ETB Trolley Wire Protector is used to prevent needless damage from high-resistance "shorts" on trolley feeders in remote and rarely frequented sections of the mine. It is a circuit breaker whose operating characteristics are properly related to the heating characteristics of 4/0 copper wire. This Protector should be viewed as insurance against costly fire hazards and as prevention of needless penalizing of electrical service elsewhere. Illustrated is a Protector in a sheet-steel enclosure arranged for padlocking.

I-T-E

Representatives in Principal Mining Areas

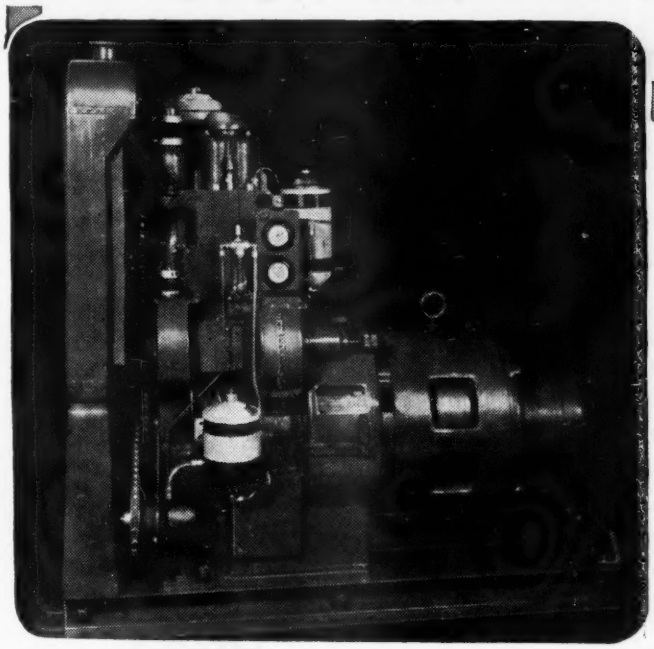
CIRCUIT BREAKER CO.,

PHILADELPHIA 30, PA.



"Power to Spare" ...IS EXPENSIVE

THE NAVY FITS THE POWER PLANT TO THE JOB



5 KW Model 7 Sheppard Diesel Generating Set used as a standby for lighting in and around the 600 KW portable power plant shown above. 4" bore x 5" stroke; single cylinder; rated at 8 HP at 1200 RPM; variable speed governor control with 4% regulation; simplified Sheppard Fuel Injection System.

NAVY ENGINEERS know that operation of a large power unit to carry a light load is injurious to its continued efficient operation. It also wastes fuel. That's why they provide a 5 KW Sheppard Diesel Auxiliary Generating Set in the 600 KW portable generating plant shown at top. This auxiliary unit is used when the power load is only a fraction of the main plant's capacity. It's also available for *emergency* lighting while the main plant is being serviced.

If there are times when *your* power requirements are below normal, take a tip from the Navy. Cut operating and maintenance costs. Install a Sheppard Diesel Auxiliary Generating Set. It provides low-cost electricity . . . low-cost power . . . because it operates efficiently on the cheapest fuel obtainable. A limited number are now available. Let us advise you how to obtain WPB approval. Mail coupon for free literature today.

POWER UNITS; 8 to 50 HP • GENERATING SETS; 3 TO 30 KW

Sheppard

ALL AMERICAN **DIESEL GENERATING SETS**

R. H. Sheppard Company
611 Middle St., Hanover, Pa.

Please send me free literature describing Sheppard Diesel Generating Sets.

Name----------

Firm Name----------

Address----------

Tower... AIR HOSE
BUILT TO TAKE PUNISHMENT IN *Mining* SERVICE

THROUGH extensive laboratory and field reseach, Republic has improved the quality of its outstanding Tower Pneumatic Hose. Today it is "better than before." Its tube is compounded to resist oil and heat from the compressor. Special braided cord reinforcing adds flexibility and strength to resist high working pressures, shock and crushing. The tough, abrasion-resisting cover will stand dragging over rock, coal and rough floors. Consult your nearest Republic Distributor about Tower for use on pneumatic tools and on operated equipment.

Better than Before

REPUBLIC RUBBER
TOWER PNEUMATIC
OIL RESISTING TUBE
YOUNGSTOWN, OHIO
WE ARE PARTICIPANTS IN THE OWNERSHIP AND OPERATION OF NATIONAL SYNTHETIC RUBBER CORPORATION

REPUBLIC RUBBER
DIVISION
LEE RUBBER & TIRE CORPORATION
YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN, O.

LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

The Beginning of the End . . . Hitler's generals knew they were licked when Allied fighting men and equipment really got rolling. One reason the blitzkrieg idea blew up in their faces is the miracle of Allied supply lines—aided by an armada of the mightiest cargo-carrying trucks any army ever had. Hundreds of these huge 10-ton, 6 x 4 Macks helped chase Rommel out of Africa. Many more hundreds of them rolled into France on the heels of D-Day fighting men. When you think of Mack's record these past 44 years, perhaps it's not surprising that big *Macks* were the trucks for this big job. And it's not at all surprising that they did the job so well. Anywhere and any time—Macks really get things done.

Performance Counts!

Mack

TRUCKS

ONE TON TO FORTY-FIVE TONS; BUSES, FIRE APPARATUS AND MARINE ENGINES

BUY U. S. WAR BONDS

Mack Trucks, Inc., Empire State Bldg., New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

HARD GROUND

SOFT GROUND

FITCHERY GROUND

THE FEED PRESSURE IS CONSTANT

THE SPEED RESPONDS *Automatically* TO THE BIT PENETRATION

Maximum drilling speed in any type of ground . . . that's what the "CF" Continuous Feed of Gardner-Denver CF-89H Drifters assures.

The "CF" Continuous Feed is an exclusive Gardner-Denver development that automatically feeds the drill to suit the ground. With Feed Throttle set for the ground, the rest is automatic —the drill will advance as fast as the bit penetrates. The type of ground being drilled actually regulates the speed of the feed—the pressure of the feed remains constant for a given throttle setting.

WHY "CF" CONTINUOUS FEEDING MEANS FASTER DRILLING

No Time Lost for Adjustment

The drill runner loses no time and the drill loses no footage from frequent manual adjustment of the speed while drilling. The "CF" does the job automatically.

Correct Striking Position Always

The "CF" built-in motor feeds the drill continuously to the correct striking position for maximum drilling efficiency and maximum chuck life.

No Crowding

Simple adjustment of the "CF" Feed Throttle will increase the feeding pressure for harder ground or for a dull bit and automatically maintain maximum drilling speed without crowding the rotation. Excessive wear is eliminated.

Less Operator Fatigue

Elimination of frequent adjustment plus ease of control cuts down operator fatigue.

For complete information on Gardner-Denver CF-89H Drifters and their elastic pressure feed, write for descriptive bulletin. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER *Since 1859*

Pumps Mine water FAST!

• *Built by* THE BROWN-FAYRO CO.

Water doesn't prevent miners from getting out coal for by-products and furnaces when this 4 x 5 Mine Gathering Pump is on the job. And this unit is always on the job because its SKF Deep Groove Ball Bearings are always on the job. Having deep, uninterrupted raceways, SKF's permit radial and thrust loads in any combination in either direction. They assure correct alignment, require only infrequent lubrication, and never need adjustments—factors that are outstanding in speedily pumping water from one or more working places directly to the outside or to a sump. Plus performance is the reason why so many of the machines winning the war are SKF-equipped. 5775

SKF INDUSTRIES, INC., PHILA. 34, PA.

SKF
BALL AND ROLLER BEARINGS

Serving the industry and our nation

★

When coal is of such vital importance to our all-out War effort, the work of the Bituminous Mine Safety Engineers becomes doubly important.

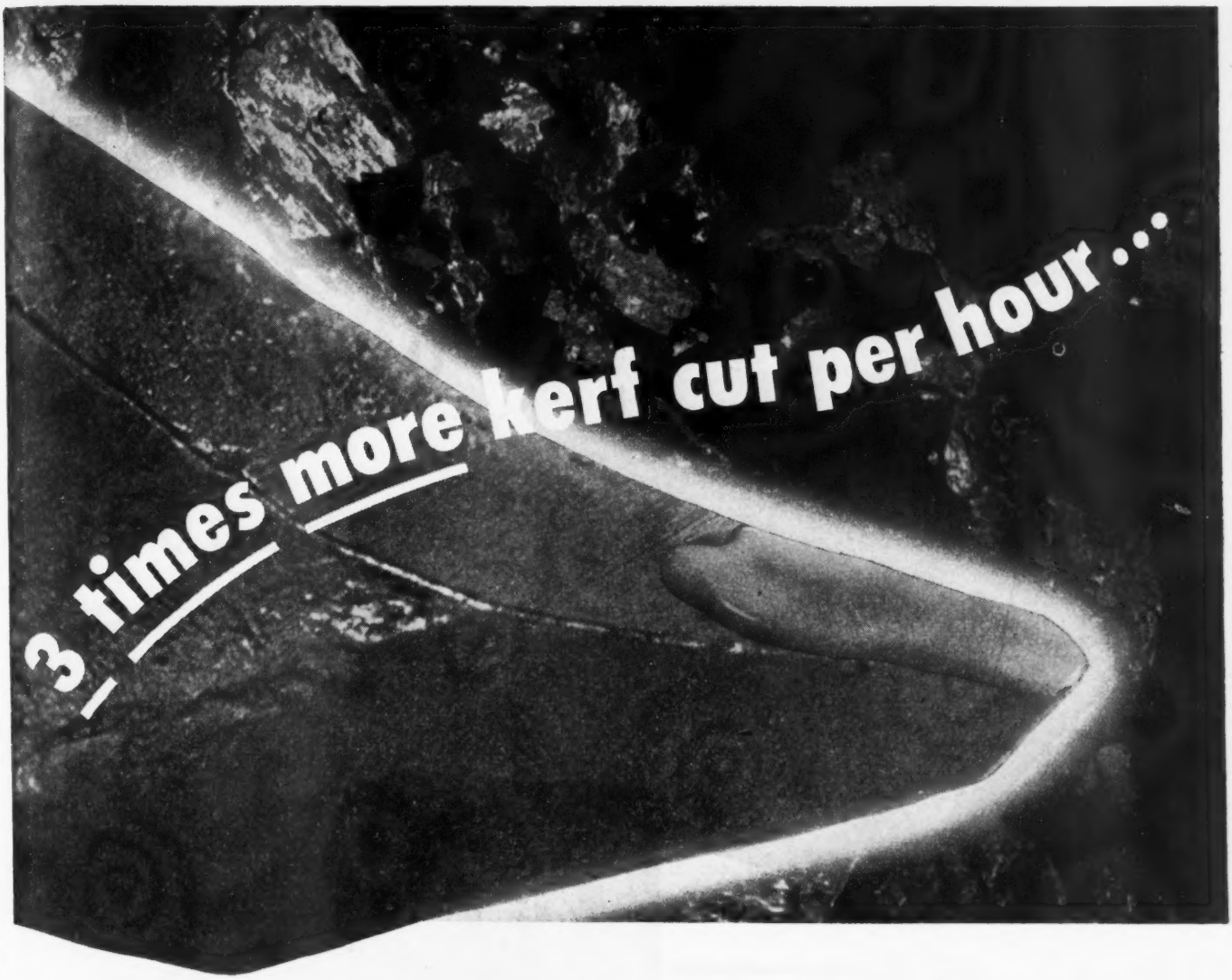
With the cooperation of mine operators and workers, Bituminous Safety Engineers are saving precious manhours by helping prevent accidents.

In a larger sense, the Bituminous Mine Safety Engineers are aiding our all-out War effort by helping to keep vital coal supplies coming from the face to the surface without letup. For Security with Service, investigate Bituminous Workmen's Compensation.

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND ILLINOIS

27 years of service to the industry



with BOROD* TIPPED BITS

BECAUSE coal cutter bits tipped with Borod stay sharp and resist wear, up to 3 times more kerf can be cut per hour of operation! Borod is a Stoody hard-facing alloy of pure tungsten carbide particles contained in mild steel tubes. Because of its hardness and cutting ability, Borod tipped bits stay on the machine longer, save downtime for bit changes, save power, get more coal production from the same equipment in less time!

STOODY COMPANY, 1143 W. SLAUSON AVE., WHITTIER, CALIFORNIA

*Borod is a copyrighted Stoody tradename for this special Stoody alloy.

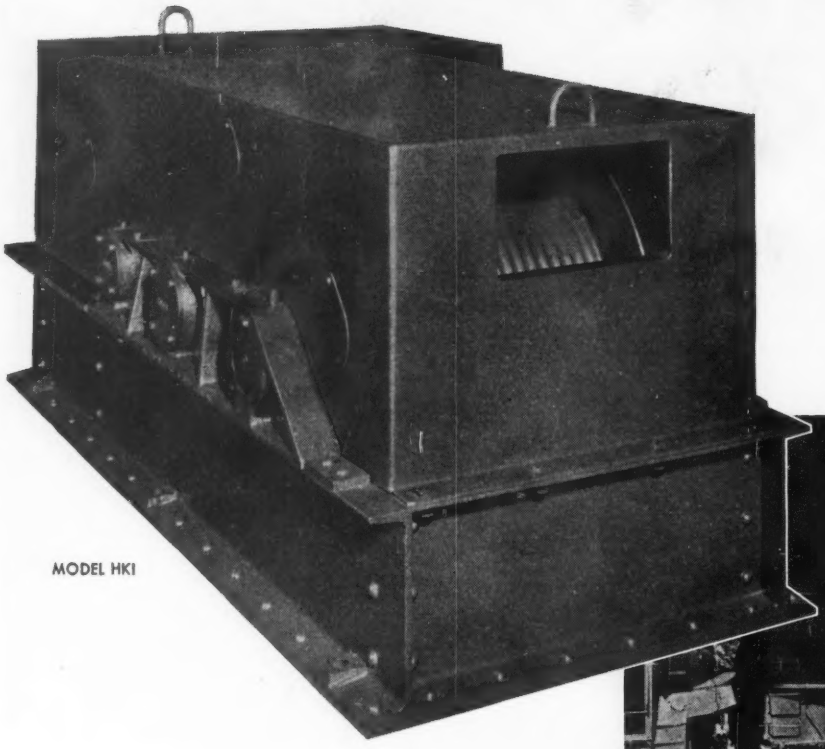
NEW FOLDER Tipping processes and advantages of Borod are fully described in our new 4-page folder. Write for your free copy today—a postcard with your name, company, and address will bring it.

STOODY HARD-FACING ALLOYS

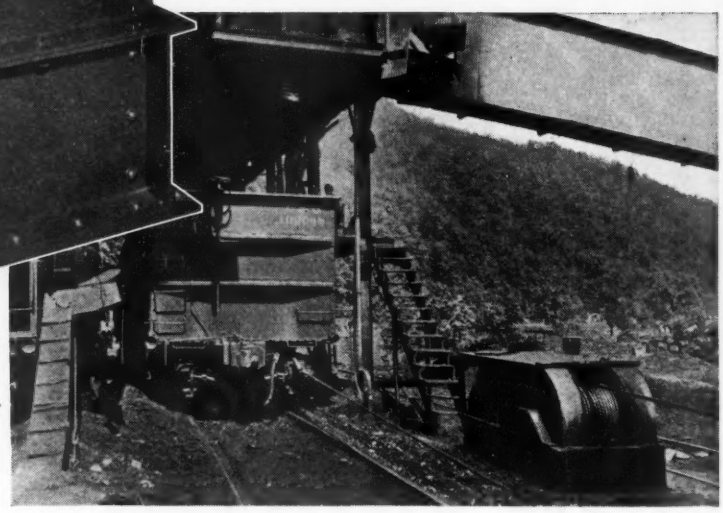
Retard wear... Save Repair

Brown-Fayro
LAYER LOADING HOISTS

Assure UNIFORMITY OF PRODUCT



MODEL HKI



A typical Brown-Fayro Layer Loading Hoist installation

Model HKI Data

Model HKI layer loading hoist, illustrated above, is rated 24,000 *lbs. rope pull and is equipped with* 40 *HP motor and powerful thrustor operated brake. Drum capacity* 450 *ft.* 1⅛" *wire rope. It is completely controlled by push buttons located at the trimmer's platform.*

VARIATIONS in physical and chemical characteristics of coal from different sections of the same mine often make it difficult to maintain a satisfactory product when loading run-of-mine or metallurgical grades.

Layer loading obtains uniformity by placing in every car the proper amount of coal from each section of the mine. Several cars in tandem are shuttled past the loading point two or more times to obtain the degree of mixing desired.

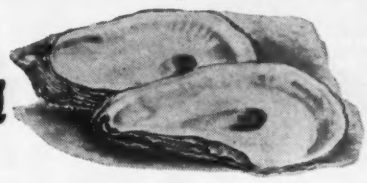
"Brownie" layer loading hoists are an efficient means of moving the cars and help you in three ways:

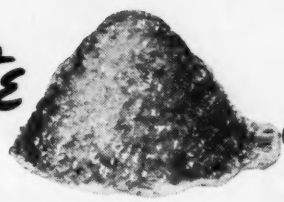
(1) Prevent an excess of either desirable or inferior coal entering any single car.
(2) Prevent segregation of lumps from fines.
(3) Reduce degradation.

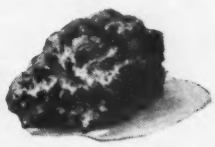
"Brownie" layer loading hoists are made in three ratings for handling two to seven railroad cars. Write for full data.

THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA.

The Case of the Oyster Shells the Dolomite and the Coke







It is bad enough to have one difficult materials handling problem. But when you have three, then it really becomes serious. That is the fix in which a certain chemical company found itself.

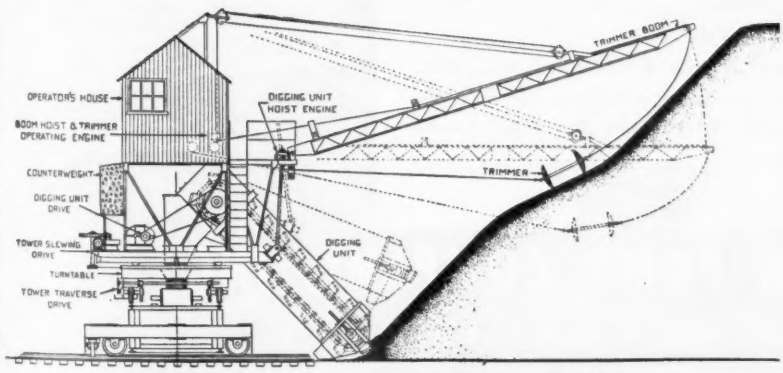
There were oyster shells and dolomite and coke—all to be unloaded, stocked in storage piles and reclaimed for use. The oyster shells tended to arch and pack; the dolomite was crystalline in form; the coke was frangible and friable. Each presented its own peculiar difficulties in handling, yet all would have to be handled on the same unified system.

The problem was put up to Robins. Some parts of it were easy—the unloading, storing and conveying; the answers were drawn from our long and varied experience. But the reclaiming was something else again. Because the oyster shells tended to arch and pack, because the coke was so easily broken, traditional reclaiming methods were not adequate; the shells would not flow and the coke would break.

Nothing in existence up to then was able to do the job properly. So Robins engineers had to invent something. We call it a "Digging Reclaimer." It under-mines the material—working along the bottom of the pile instead of the top. It reduces degradation and breakage to an absolute minimum. It reduces the cost per ton of material reclaimed to a figure never before reached.

Thus another difficult problem was solved. Thus another innovation was added to an already imposing list of Robins "firsts." Thus another company was able to obtain celerity, efficiency and economy in the handling of its materials.

Solving difficult bulk-materials handling problems has been a Robins habit since 1896. Perhaps you face one now. If so, you are invited to submit the facts to Robins for unbiased, non-obligating analysis. When writing, please address Dept. CM-3.



Cross-section view of Robins Digging Reclaimer

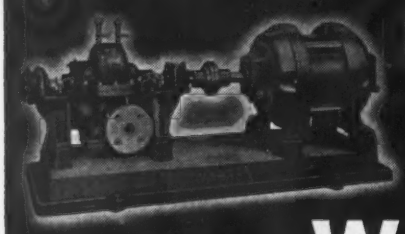
ENGINEERS, MANUFACTURERS AND ERECTORS OF MATERIALS HANDLING MACHINERY

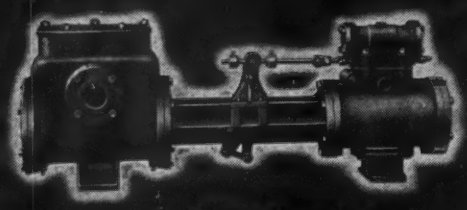
ROBINS *makes:* BELT CONVEYORS · COAL AND ORE BRIDGES · BUCKET ELEVATORS · CAR AND BARGE HAULS · CAR DUMPERS · CAR RETARDERS · CASTINGS · CHUTES · CONVEYOR IDLERS AND PULLEYS · CRUSHERS · FEEDERS · FOUNDRY SHAKEOUTS · GATES · GEARS · GRAB BUCKETS · PIVOTED BUCKET CONVEYORS · VIBRATING SCREENS · SCREEN CLOTH · SELF-UNLOADING BOAT MECHANISMS · SKIP HOISTS · STORAGE AND RECLAIMING MACHINES AND SYSTEMS · TAKEUPS · LOADING AND UNLOADING TOWERS · TRIPPERS · WEIGH LARRIES · WINCHES · WINDLASSES

ROBINS
CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's **ROBINS**

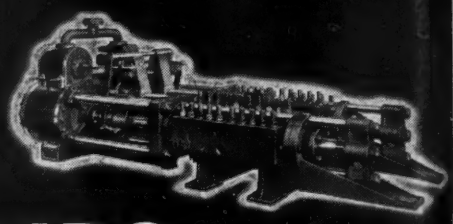
Warren Two-Stage Volute Centrifugal Pump





Warren Steam Heat Vacuum Pump

Warren Horizontal Duplex Hydraulic Pump



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for Post-War Planning Include:

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Single and multi-stage
Pressure range: 0 to 850 P. S. I.
Capacities: 0 to 36,000 G. P. M.
Types: Horizontal & Vertical
Impellers: Open or enclosed
Casings: Horizontal or Vertical Split, cast iron or bronze
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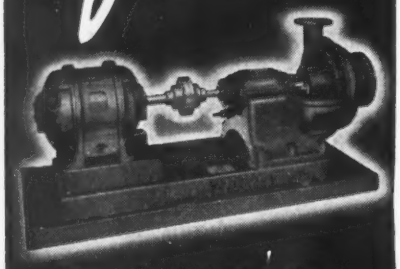
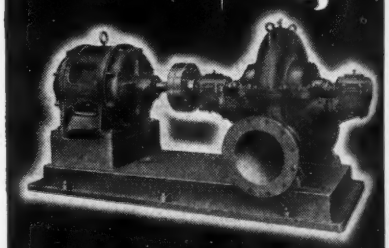
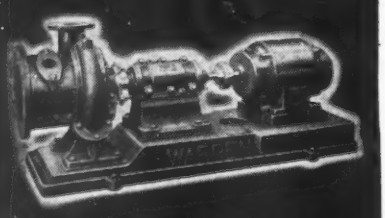
Send your pumping problem to us; our Engineers will recommend the right pump for the job.



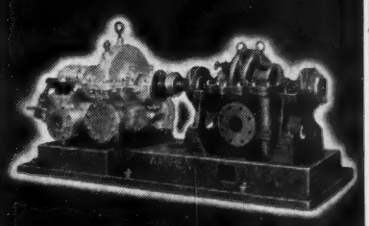
Warren Type "L" Single-Stage Single-Suction Liquor Pump



Warren 14-in. Single-Stage Double Suction Pump



Warren Heavy Liquid Centrifugal Pump



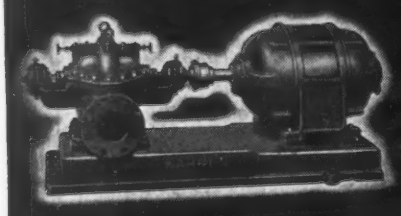
Warren Two-Stage Volute Centrifugal Pump

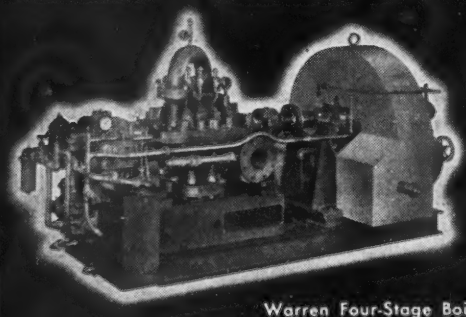
ARMY E NAVY

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

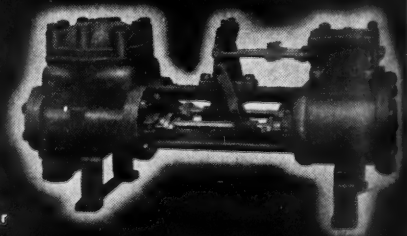
Warren Single-Stage High Speed Centrifugal Pump





Warren Four-Stage Boiler Feed Pump

Warren Horizontal "Realwear" Duplex Piston Pump



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with Simplex Mine Roof Jacks

Cost-conscious mine operators have proved that Simplex Mine Roof Jacks cut costs per ton. They have found that:

- ✓ They are quickly installed and easily removed—no wedge blocks to hammer.
- ✓ They will not weaken in use—are stronger and safer than wood posts.
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The *new* M9 Mine Roof Jack. Screw and base can be used with pipe of any length.

New M9 and M17 Models Offer Added Advantages!

The new M9 and M17 Round Pipe Mine Roof Jacks offer further savings and increased usefulness. All you buy is the screw assembly and base. These are easily fastened to a piece of 2" pipe of the desired length and you have a jack made to order for the job at hand. In mines with seams of varying heights the use of these jacks does away with the necessity for a large inventory of timbering material. They cost less because all that you buy is the base and screw assembly. By furnishing your own pipe for the center column, you do not pay for extra material or added shipping weight.

Simplex Model M9, 8-tons capacity, has a 1½" screw for use with standard 2" pipe.

Simplex Model M17, 16-tons capacity, has a 1⅞" screw and is made for use with heavy duty 2" pipe.

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Simplex
LEVER · SCREW · HYDRAULIC
Jacks

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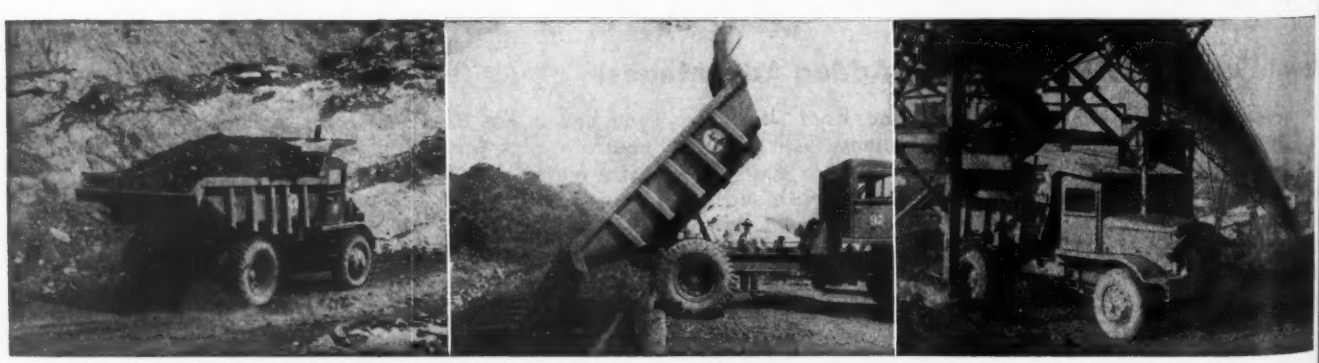

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EUCLID THE PIONEER

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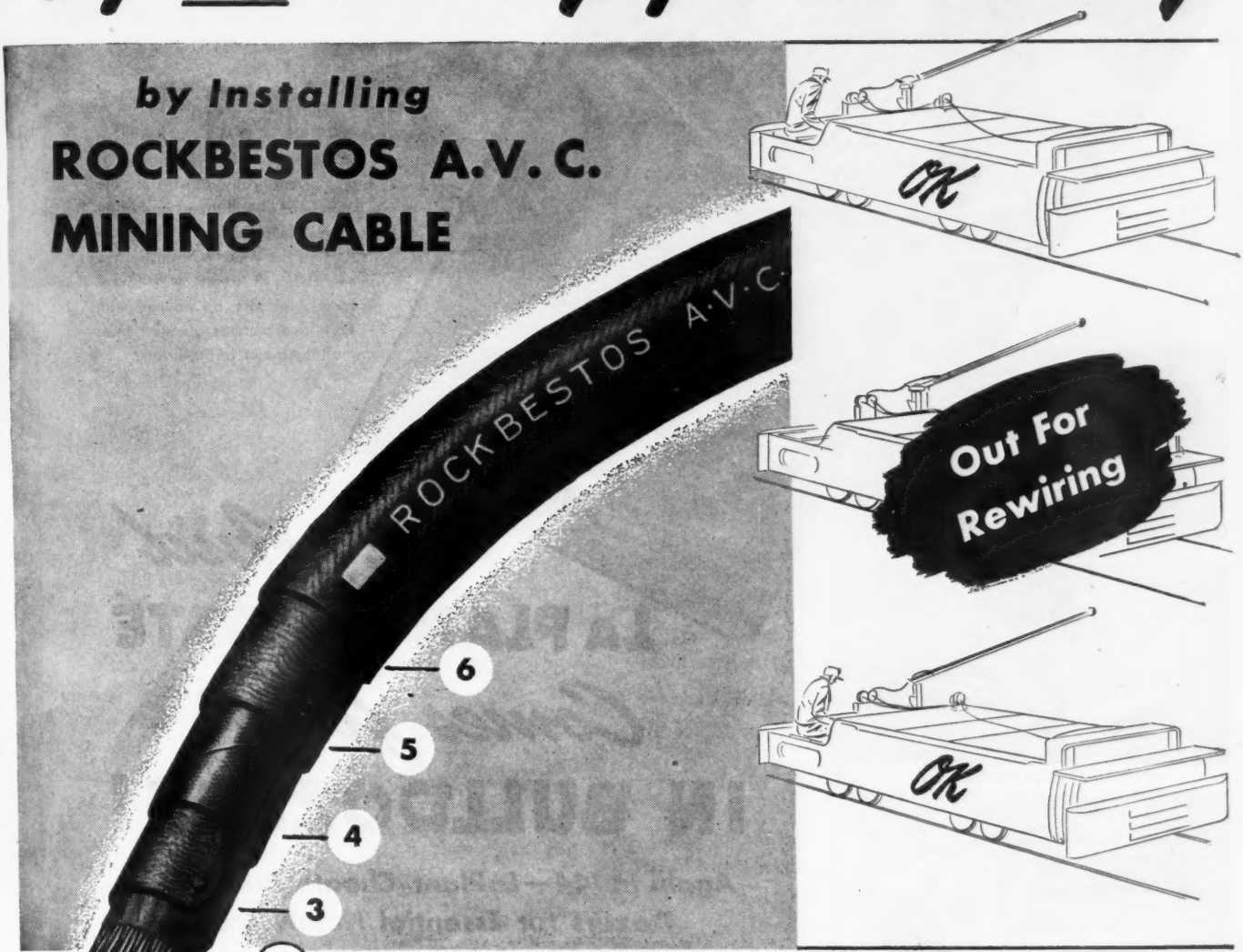
by Installing ROCKBESTOS A.V.C. MINING CABLE



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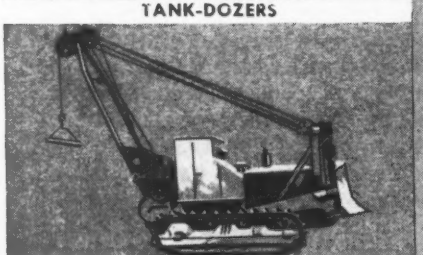
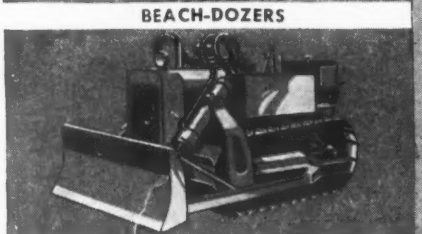
TANK-DOZERS



BEACH-DOZERS



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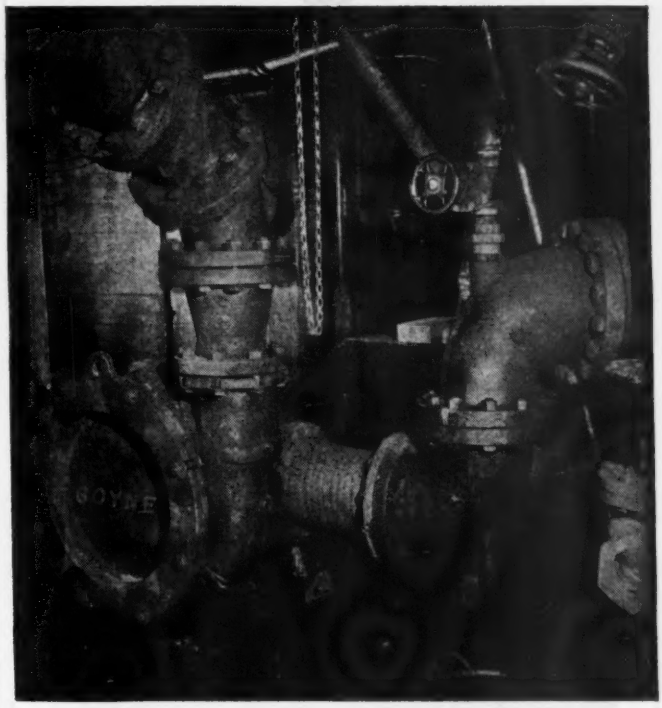

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5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.

ASHLAND, PA.

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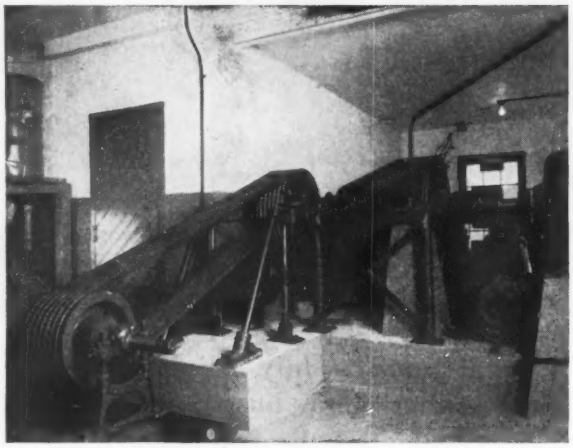
Meet Highest Safety Standards



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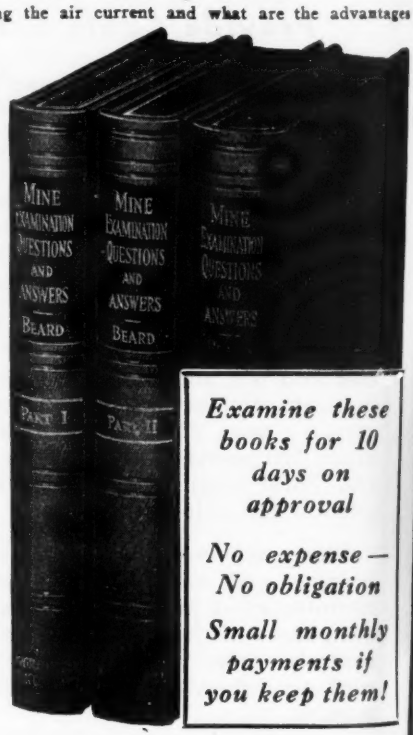

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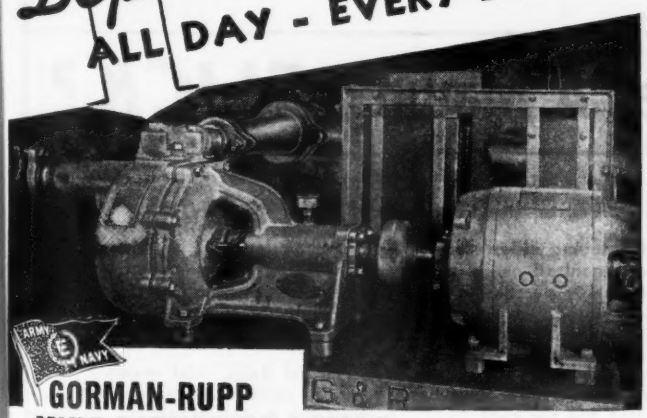

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SELF-PRIMING CENTRIFUGAL PUMPS

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Equip your d.c. and slip ring motors, generators, and other commutating machines with Speer Carbon Brushes and watch them perk up. More and more users are finding that Speer Brushes give more freedom from burning, overheating, sparking, excessive wear and energy losses, and other brush troubles that decrease operating efficiency, cause extra maintenance.

Good brush performance calls for brushes that are matched—electrically and mechanically—to the characteristics and service conditions of each machine.

Matching brushes to machines has been one of Speer's specialties for nearly 50 years. From its all-inclusive selection of standard and special carbon, graphite, electro-graphite and metal-graphite brushes, Speer can supply the grade that will mean peak performance, fewer brush renewals and less maintenance on any application.

So, if you want to be sure of trouble-free brush operation, switch to Speer. You'll get sound practical advice, plus quality brushes matched to your machines. See your favorite supply house or electrical contractors, or write direct for Brush Data Forms.

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1366

What Makes A Mailing *CLICK?*

Advertising men agree—the list is more than half the story.

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

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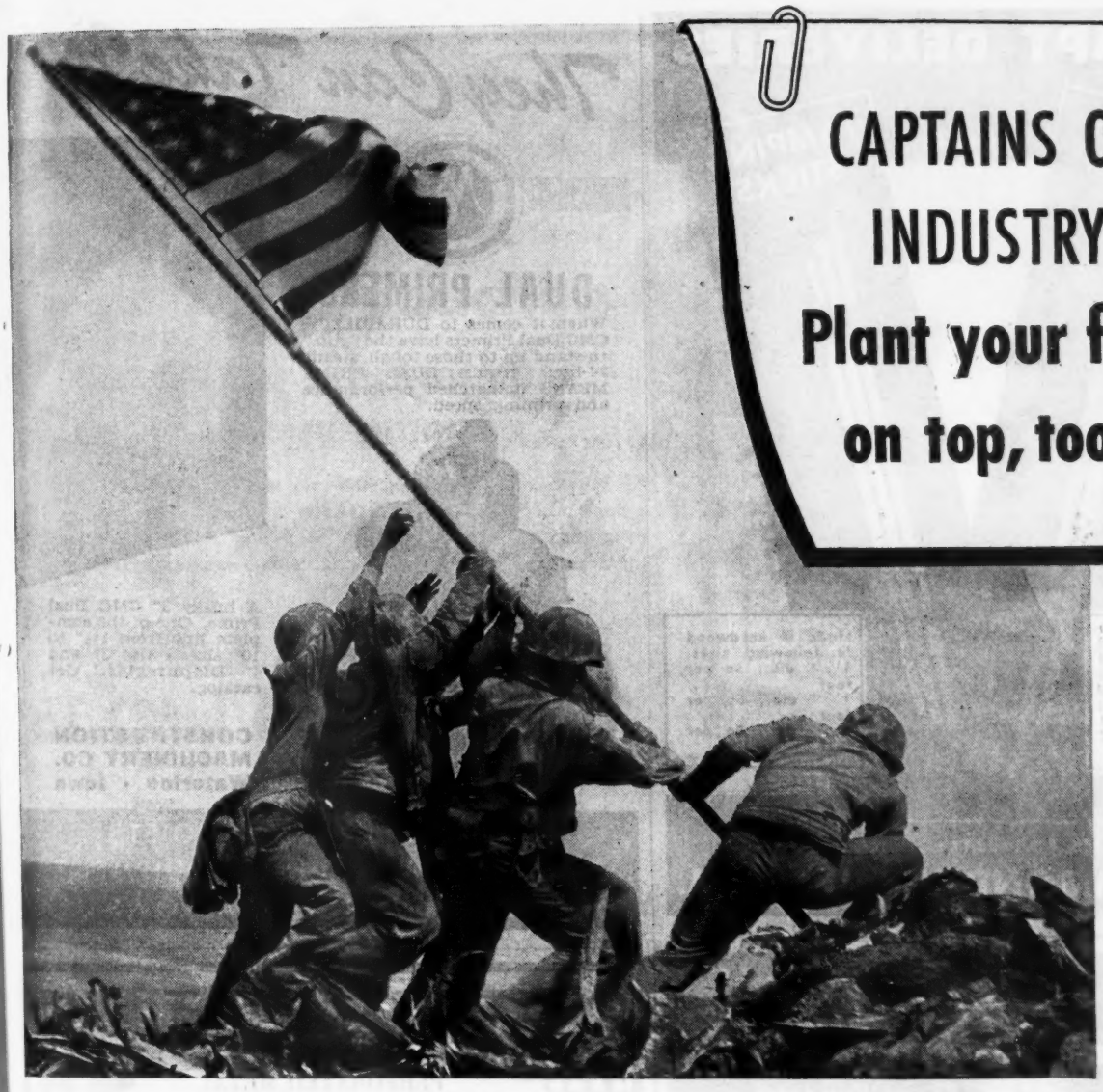
330 West 42nd Street *New York, 18, N. Y.*



CAPTAINS OF INDUSTRY Plant your flag on top, too!

This year we've got to make 2=3!

This year we've got to make 2=3! We've got to lend Uncle Sam in 2 chunks almost as much as we lent last year in 3. Which means that, in the approaching 7th War Loan, each of us is expected to buy a BIGGER share of extra bonds.

The 27 million smart Americans on the Payroll Savings Plan are getting a headstart! Starting right now they are boosting their allotments for April, May and June—so that they can buy *more* bonds, and spread their buying over *more* pay checks.

Our Marines went over-the-top at Iwo Jima in the greatest, and hardest, battle in the Corps' history. Now it's *your* turn! Your quota in the 7th is needed to help finish this war, sidetrack inflation, build prosperity. So, captains of industry, plant your flag on top—like the Marines at Iwo Jima!

★

CAPTAINS of INDUSTRY—here's your *Check List* for a successful plant drive:

- ★ **Get your copy of the "7th War Loan Company Quotas" from your local War Finance Chairman. Study it!**
- ★ **Determine *your* quota in E Bonds — the backbone of every War Loan.**
- ★ **Arrange for plant-wide showings of "Mr. & Mrs. America"—the new Treasury film.**
- ★ **Distribute "How to Get There"—a new War Finance Division booklet explaining the benefits of War Bonds.**
- ★ **Circulate envelopes for keeping bonds safe.**
- ★ **Display 7th War Loan posters at strategic points.**
- ★ **And—see that a bench-to-bench, office-to-office 7th War Loan canvass is made.**

★

The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

PROMPT DELIVERIES

TROLLEY POLES - and - TAMPING STICKS

Standard size have 2½" dia. base and 1¾" dia. top end in any desired length. Standard size 12c per lineal ft. 14c per lineal ft. on other special sizes.

Made in hardwood in following sizes: 1⅛" dia., 5c per foot 1¼" dia., 6c per foot 1½" dia., 8c per foot

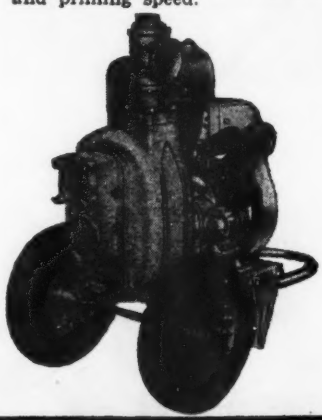
WRITE FOR CATALOG NO. 10

J.V. HAMMOND SPANGLER, PENNA.

They Can Take It!

DUAL PRIMERS

When it comes to DURABILITY, CMC Dual Primers have the "guts" to stand up to those tough, steady 24-hour grinds. DUAL PRIME MEANS unmatched performance and priming speed.



A husky 3" CMC Dual Prime. One of the complete line from 1½" to 10" sizes. Also 3" and 4" Diaphragms. Get catalog.

CONSTRUCTION MACHINERY CO.
Waterloo · Iowa

MIXERS • PUMPS • HOISTS
BATCHING & PLACING EQUIPMENT
SAWS • CARTS • BARROWS

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TRADE MARK

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ONE-MAN COAL DRILL

. . . lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day". Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.
Division of The R. K. LeBlond Machine Tool Co.
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PERFORATED METAL
COAL MINING SCREENS

Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
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Benefit by the many years of experience in designing and manufacturing of

The L.R. CHRISTIE CO.

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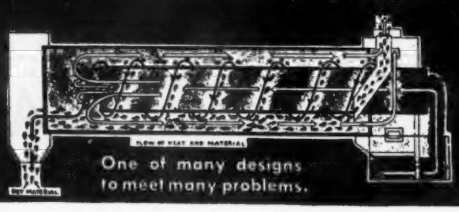
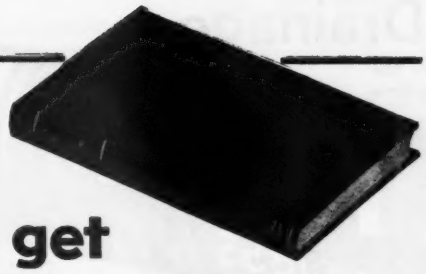


One of many designs to meet many problems.

Dryers
Calciners
Coolers



How to get peak coal production

from your mechanical-loading equipment

Here are the most efficient methods of using various types of loading machines, conveyors, scrapers, and certain special equipment, in the loading and handling of coal underground, now presented in a readable, thorough, and practical treatment.

Mechanical Loading of Coal Underground

By IVAN A. GIVEN
EDITOR, *Coal Age*

397 pages, 6 x 9, 222 illustrations, $4.00

THIS practical manual thoroughly discusses the various types of equipment used in slope sinking, entry-driving, and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment and under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

Included in this sound book are over 200 necessary maps, plans, and sketches, showing how methods described in the text are practically applied to actual working conditions. A liberal number of mining plans tested in given mines throughout the country are here, as well as the latest thought on face, reparation, power supply and maintenance.

Tells you:

—every possible way in which equipment can be used
—how to keep equipment in first-class running order
—what factors to consider in purchasing mechanical-loading equipment
—when a small investment in simple attachments saves the purchase of an entire new machine
—installation considerations for all equipment
—methods for increasing mining extraction etc., etc.

CONTENTS

1. Mechanical-Coal-loading Principles
2. Mechanical-Coal-loading Essentials
3. Types of Mechanical loading Units, Characteristics, Crews, Unit production—Hand-loaded Equipment.
4. Types of Mechanical-loading Units, Characteristics, Crews, Unit Production—Self-loading Equipment.
5. Slope-sinking and Development with Mechanical-loading Equipment
6. Conveyor-mining Plans
7. Scraper-mining Plans
8. Mobile-loader Mining Plans
9. Face Preparation
10. Power for Mechanical Loading
11. Maintenance in Mechanical Loading

McGRAW-HILL ON-APPROVAL COUPON

McGRAW-HILL BOOK CO., 330 W. 42 St., New York 18, N.Y.
Send me Given—Mechanical Loading of Coal Underground for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

Name .....
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Position .....
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(Books sent on approval in U.S. and Canada only.)

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

Flexco HD Rip Plate

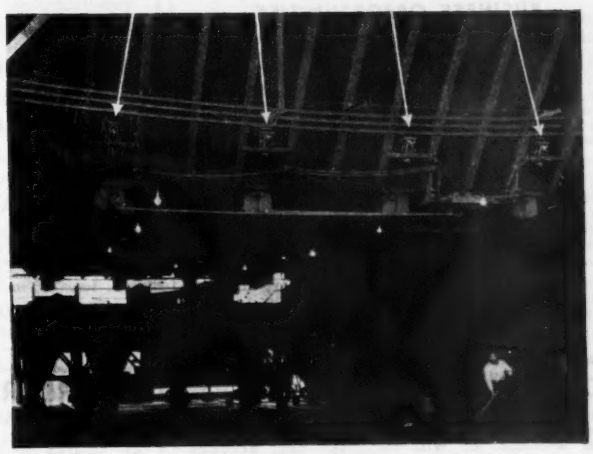
Flexco HD Belt Fastener

FLEXIBLE STEEL LACING CO.
4638 Lexington St., Chicago, Ill.

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

SYNTRON
Pulsating Magnet

ELECTRIC VIBRATORS



with Adjustable Power

FLOW WET COAL FREELY

THRU BUNKERS, CHUTES & HOPPERS

3600 powerful vibrations per minute eliminate costly coal stoppages by preventing "arching-over" and "hanging-up."

Catalog literature on request

SYNTRON CO., 975 Lexington, Homer City, Pa.

WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has a 90 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established 1855

Shipments from stock day after receipt of order. Send for catalog.

A. WYCKOFF & SON CO.

Office and Factory
No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe

Emergency orders can be delivered by truck to mines in Pennsylvania coal fields following morning after receipt of same.

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Carbondale 1600

for

PERFORATED PLATE

Round—Square—Diagonal—Slot

Any perforation

HENDRICK MANUFACTURING CO.
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Sales Offices in Principal Cities
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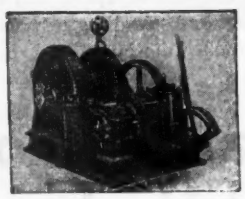
FLORY HOISTS



Manufacturers of Steam, Electric and Gasoline Hoists of all types; also parts for all model Flory Hoists.

FLORY MANUFACTURING CO.
BANGOR, PENNSYLVANIA

SEARCHLIGHT SECTION

POSITION WANTED

CHIEF ELECTRICIAN and master mechanic available, desires connection with large coal company. Thoroughly familiar with mechanized mining. Power plants, machine shop, substations, winding. AC & DC. PW-301, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

BUSINESS OPPORTUNITIES

FOR SALE Virgin Coal Field, 8984 acres undeveloped. Pittsburgh seam; located in Wetzel Co., W. Va. at Littleton, on B. and O. R.R. Near Green Co., Penna. A state line. R. J. McGee, Secretary & Treas., 340 Braddock Avenue, Uniontown, Pa.

167 ACRES Undeveloped Coal, Pittsburgh or River vein. East Finley Township, Washington Co. Pa. Seven foot vein. Priced to sell. James L. Brownlee, 3436 Clay St., Denver 11, Colorado.

FOR SALE 400 acres coal on royalty or outright basis. Half-mile to two railroads, on pavement to Chicago, on power line, six miles to city, boiler water available, good drainage, no grading necessary for switch. More acreage available if desired. C. D. Hansel, 2401 N. 9th St., Terre Haute, Ind.

COAL ACREAGE Wanted. Corporation will pay cash for going coal stripping operation with coal acreage, or will purchase coal acreage and strip with our equipment. State seam and thickness, analysis, amount of coal, height and type of overburden, proximity to railroad and other pertinent data. BO-297, Coal Age, 330 W. 42nd St., New York 18, N. Y.

FOR SALE: 1200 acres of coal land carrying the Splash Dam, Clintwood and other seams, two miles frontage on Norfolk and Western Railway. This is offered for sale to settle an estate. W. L. Dennis, Grundy, Virginia.

COAL MINE owner, now inactive, will make attractive deal with small but reputable operator having limited means. Give references. BO-303, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED

DRAFTSMEN

Designers, layout men and detailers experienced in elevating and conveying machinery or reinforced concrete, steel and wood structures as applied to coal handling and preparation plants. State qualifications, experience and compensation expected.

ROBERTS AND SCHAEFER CO.
307 North Michigan Avenue
Chicago 1, Ill.

PREPARATION PLANT, etc.

Tipple, washery including shakers, tables, booms, crushers, vibrators, retarders, etc. making seven sizes also railroad tracks, scale, machine shop, supplies etc. Good for strip or deep mine. Will sell, lease or invest.

BO-299, Coal Age
520 N. Mich. Ave., Chicago 11, Ill.

LUMBER AND TIMBER
AVAILABLE NOW

for Mining and Construction from 1" up to 16"x16" Fir, Hemlock and Southern Pine. Deliveries at once by trucks or R.R. Cars.

HILLCREST LUMBER CO., INC.
1060 Grand St. Brooklyn, N. Y.
Phone: EVergreen 7-2121.

WANTED

Modern small steel tipple for Truck Coal Mine

W-298, Coal Age
520 N. Michigan Ave., Chicago 11, Ill.

FOR COAL STRIPPING

3—Euclid Model 9 FDT Tractors (used 1 job) 150 HP. Cummins Diesel Engines with 58-W Bottom Dump, 13 yd. Trailers, 21.00 x 24" Pneumatic Tires.

FS-300, Coal Age,
330 W. 42d St., New York 18, N. Y.

FOR SALE

TWO 5 B. U. JOY LOADERS

220 Volt A.C. Motors Practically new. Also one spare motor for same

CLARENCE McCORMICK
DUQUOIN ILLINOIS

WANTED

DRILLING MACHINE

56A Jeffrey Track Mounted Drilling Machine 250 volts. Permissible 44" gauge.

BATON COAL COMPANY
Union Trust Bldg. Pittsburgh, Pa.

New "SEARCHLIGHT" Advertisements

received by April 26th will appear in May issue, subject to space limitations.

Departmental Staff
COAL AGE
330 West 42nd St., New York 18, N. Y.

FOR SALE

We Have Just Purchased the #48 Mine of the Peabody Coal Company, Near Dugger, Sullivan County, Indiana, About 22 Miles From Terre Haute. This Was a 3000-Ton Capacity Mine. All of the Equipment Was Operating Up Until Two Weeks Ago When It Was Brought to the Surface.

STEEL TIPPLE

1—5-Track Webster all structural steel, late type tipple, complete with 3-section shaker screens, 8' wide, three loading booms and picking tables, 60" wide, 53' long, 9" pitch. All steel frames, complete with boom hoists and worm speed reducers. Tipple equipped for preparation of seven grades of coal, complete with motors, conveyors and all necessary appurtenances.

MOTOR GENERATOR SETS

2—150 KW G. E. Motor Generator Sets, 1200 RPM, type MPC and ATI, 250/275 volt DC, 3 phase, 60 cycle, 2300 volt AC, complete with switchboards and all necessary switchgear.

2—200 KW G. E. Motor Generator Sets, type MPC and ATI, 1200 RPM 727 amps., 250/275 volt DC, 3 phase, 60 cycle, 2300/4000 volt AC, P. F. .8, complete with switchboards and all necessary switchgear, including automatic reclosing circuit breakers.

2—100 KW G. E. Motor Generator Sets, 250/275 volt DC, 1200 RPM, 3 phase, 60 cycle, 2300 volt AC, complete with switchboards and switchgear.

ROTARY CONVERTERS

2—150 KW G. E. late pedestal type Rotary Converters, type HCC-6, form P, 1200 RPM, 250/275 volt DC, equipped with 2300 volt transformers.

MINE CARS

400—2½-ton butcher body, end dump type wood mine cars. 42" gauge, height overall 40", width overall 52", inside length 7'10", overall length 9'2", wheel base 26", axles 2½", equipped with 16" Sanford-Day Wheels. Offering them for quick sale at $38.00 each. All in excellent condition and have with them approximately $1200.00 worth of new parts and supplies.

MINE FANS

1—4 x 8 Jeffrey reversible, double inlet steel encased fan with 75 H.P., 3 phase, 60 cycle, 2300 volt motor. Have with same an auxiliary motor, 50 H.P., variable speed.

1—Jeffrey exhaust and blower fan, complete with motor and drive.

CUTTING MACHINES

5—12-AA Goodman standard, 50 H.P., 250 volt Shortwall Mining Machines, all on self-propelled trucks, 42" gauge, complete with cable reels and cable, 7' cutter bars and practically new Cincinnati Chains.

4—12-G3 Goodman, 3 phase, 60 cycle, 220/440 volt AC Shortwall Mining Machines, 42" gauge, self-propelled trucks, cable reel and cable.

2—112-G3 Goodman Universal, 220/440 volt AC, on 42" gauge, self-propelled trucks, cable reel and cable.

15—Sullivan CE-7, 250 volt DC permissible type Shortwall Mining Machines.

10—Sullivan CE-7, 3 phase, 60 cycle, AC Shortwall Mining Machines.

ARCWALL MACHINES

4—Jeffrey 29-C 250 volt Arcwall Machines, 42" gauge, with 9' cutter bars, practically new Cincinnati Chains, cable reels and cable. These are bottom cutters with 16" adjustment screws. We have with these machines an extra armature and approximately $1200.00 worth of new parts and supplies.

2—Goodman 224-BJ Slabbing Machines.

LOADING MACHINES

12—5-BU Joy Loading Machines, 250 volt DC, on caterpillar trucks, with good cable. All in excellent operating condition, ready to go right into service. There is an extra armature and several thousand dollars worth of new parts. We are offering these machines, subject to your immediate inspection and prior sale, for $2200.00 each. They were loading coal up until March 23rd when this mine was shut down.

2—260-D Goodman AC Track Loading Machines, complete with cable — recently overhauled.

10—Jeffrey 38-B Car Loading Conveyors. Also good for road cleaning by widening head and excellent for development work.

LOCOMOTIVES

1—10-ton G. E. Haulage Locomotive—
Serial number 9177
Motors—HM-809, 250 volt B.B.
Speed ..... 7.8 MPH
Height overall ..... 36"
Length overall ..... 12'8"
Wheel base ..... 54"
Outside armorplate frame ..... 3"
Track gauge ..... 42"
Controller type R-109
Equipped with steel strip resistance and equalizing springs.

1—10-ton Jeffrey Haulage Locomotive—(13-ton equipment)
Serial number 4780
Motors—MH-110, 250 volt B.B.
Controller type MB-26E
Steel tired wheels ..... 33"
Wheel base ..... 60"
Axles ..... 4½"
Draw bar pull ..... 6500#
Outside armorplate frame ..... 2"
Speed ..... 8½ MPH
Equipped with gear cases and steel strip resistance.
Have extra armature and extra set of new trucks for same.

5—8-ton Goodman Locomotives—
Serial numbers—2898—3095—2921—3149—2579
Motors—32-0-4-T, 250 volt B.B. 40 H.P. each
Height ..... 31"
Length overall ..... 13'
Inside steel tired wheels ..... 28"
Outside armorplate frame ..... 11½"
Wheel base ..... 48"
Controller type LM-64
Draw bar pull ..... 4000#
Track gauge ..... 42"
Equipped with steel strip resistance and gear cases.
CY-21 floating type gathering reels and good cable.
Have about $2000.00 worth of new parts and supplies for above locomotives.

8—8-ton G. E. Locomotives—
Serial numbers—8406—8407—7534—9844—10381—10382—10383.
Motors—HM-822, 250 volt B.B.
Controller type R-109
Height overall ..... 31"
Draw bar pull ..... 4000#
Wheel base ..... 46"
Outside armorplate frame ..... 2½"
Steel tired wheels ..... 30"
CY-21 floating type gathering reels and cable.
Armatures are equipped with Mica Glass Insulated Coils—have steel grip resistance, gear cases—all rebuilt and guaranteed.

6—6-ton G. E. Gathering Locomotives—
Serial numbers—5308—4287—7503—4007—7487—1945
Motors—HM-823, 250 volt B.B.
Controller type R-86E
Draw bar pull ..... 3000#
Wheel base ..... 44"
Inside armorplate frame ..... 11½"
Length overall ..... 12'8"
Height overall ..... 32"
Track gauge ..... 42"
Equipped with steel strip resistance and CY-21 floating type gathering reels, with cable.
Have about $1500.00 worth of new parts and supplies for the above locomotives.

2—6-ton Westinghouse Locomotives—
Serial numbers—52058—52947
Motors—904-C, 250 volt B.B.
Height ..... 33"
Length ..... 13'4"
Wheel base ..... 40"
Track gauge ..... 42"
Inside bar steel frame ..... 11½"
Outside steel tired wheels ..... 28"
Draw bar pull ..... 3000#
Equipped with steel strip resistance, cable reels and good cable.

All of the above locomotives have been kept in the very best of operating condition and are ready to go right back into service. We have a considerable amount of extra sets of trucks, armatures and parts for all of these locomotives.

ELECTRIC DRILLS

19—Chicago-Pneumatic Electric Coal Drills, complete with cable.

MACHINE SHOP EQUIPMENT

Electric Welding Outfits, Power Shears, Lathes, Radial Drills, Air Compressors, Acetylene Cutting and Welding Outfits, Motor Driven Grinders, Hack Saws, Hydraulic Wheel Press. A world of other items.

WASH HOUSE EQUIPMENT

450—Clothes basket hangers with chains and pulleys.

36—Shower Heads.

CAR PULLER HOISTS

2—24 x 18" complete electric car pullers, equipped with 40 H.P., 3 phase, 60 cycle, 220 volt G. E. Induction Motors, controllers, brakes and all necessary appurtenances.

RAIL AND COPPER WIRE

Several hundred tons of 20, 30, 40 and 60# good relaying rail and several thousand feet of 500,000 and 1,000,000 C/M bare cable and 4/0 trolley wire.

ELECTRIC HOISTS

1—1300 H.P. Ottumwa Shaft Hoist, two drums each double cylindro-conical 9 to 11', will spool 700' of 1⅞" rope, equipped with Ward-Leonard Control and latest type braking device. Complete specifications on request.

1—700 H.P. Connellsville Electric Single Drum Slope Hoist, drum 6'8", diameter 58½" face, rope pull 28,000#, capacity 3000' of 1⅜" rope. Complete with switchboards, full automatic switchgear and all necessary appurtenances.

A world of other miscellaneous items and supplies at this mine too numerous to mention. Come direct to the mine which is about 22 miles south of Terre Haute, Indiana.

Our Messrs. G. M. Lott and S. J. Wolfe will be at the mine to show you this equipment.

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

WHAT HAVE YOU TO OFFER FOR CASH?

COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING, TERRE HAUTE, INDIANA

LONG DISTANCE PHONE-34 — LOCAL PHONE—CRAWFORD-5493

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44" as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839
Battery Locomotives GE., Ironton and Atlas.

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—Jeffrey MH 100, frame only.

MINING MACHINES

Jeffrey. 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head.
Revolving head for 29C.
Goodman. 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA.
2—124E.J.
Motors for 212AA, both 250 and 500 volts.
Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt).
2—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets
2—100 KW **G.E.** Rotary.
1—100 KW **Allis-Chalmers** Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB, 12AA, 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Goose-neck). 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 24"x24" * ROPE & BUTTON CONVEYOR 400' long * LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC. 3-60-440, 1 ton and 2 ton * 1 clam shell bucket 1¾ cubic yard. 1—Figure 8 drum * MINE CARS * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

★ MINING EQUIPMENT READY FOR DELIVERY ★

GENERATORS

1—100-KW. G.E. type TC-6 Rotary converter complete with 2300 volt transformers and complete switchboard equipment, 250 volt D.C.
1—200-KW. G.E. type TC-6 Rotary Converter, 250 volt D.C. complete with switchboard, and extra armature.
1—100-KW. Westinghouse, type SK-180, 250 volt generator with switchboard.
1—150-KW. Jeffrey generator, 250 volt, with or without switchboard.
1—62½ KVA 220 volt G.E. Alternator complete with switchboard and 100-HP. natural gas engine.

CUTTING MACHINES

1—124-AA Goodman Slabbing machine, 250 volt, top or middle cutter.
1—29-C Jeffrey arcwall, 250 volt, top or bottom cutter.
2—12-AA Goodman shortwalls, 250 volt, with or without trucks.
1—28-A Jeffrey shortwall, with or without truck, 250 volt.
4—35-L Jeffrey shortwalls, 220/440 volt A.C. less trucks.
1—CR-8 Sullivan, 250 volt, with or without truck.
2—212-AA Goodman machine armatures, 500 volt.
1—28-A Jeffrey machine armature, 500 volt.
2—28-A Jeffrey machine armatures, 250 volt.

LOCOMOTIVES

1—6-ton Goodman 36-C Locomotive, 250 volt, 42" gage.
1—5-ton Goodman 30-B Locomotive, 250 volt, 42" gage.
1—5-ton Goodman, type 8-A, locomotive, 250 volt, 42" gage.
1—5-ton Goodman, type 8-A locomotive, 250 volt, 48" gage.
1—8-ton Westinghouse, type 65, 250 volt 44" gage.

MISCELLANEOUS

1—Jeffrey Locomotive crab complete, 250 volt.
1—16" Steptoe shaper complete.
1—35-HP. single drum hoist.
A.C. motors complete for standard and low vein Goodman cutting machines 220/440 volt.

ALL-STATE EQUIPMENT CO.
LOGAN, W. VA.

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW G.E. SYN. 275 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V., Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

500 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.
300 KW G.E. SYN. 575 V. 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW G.E. Ind. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.

LOCOMOTIVES

15-T WESTGHSE., 250 V. 908-C Mts., 36"-44" Ga.
13-T WESTGHSE., 250 V., 908-C Mts., 36"-48" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 250 V., 906-C Mts., 36-44" Ga.
8-T WESTGHSE., 500 V., 906-C Mts., 36"-42" Ga.
8-T GEN. ELEC., 250 V. 339 Mts., 36"-48" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

—TRANSFORMERS—

BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

NEW AND GUARANTEED
Used Steel Pipe and Boiler Tubes
Steel tanks—steel buildings
all sizes and kinds
Valves and fittings.
JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yds., St. Clair Co., Ill.

RAILS NEW AND RELAYING

TRACK ACCESSORIES
from **5** *Warehouses*
• PROMPT SHIPMENTS
• FABRICATING FACILITIES
• TRACKAGE SPECIALISTS
EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
PITTSBURGH • CHICAGO • NEW YORK

RELAYING RAILS

and accessories
Immediate Shipment
MIDWEST STEEL CORPORATION
CHARLESTON WEST VIRGINIA

RAILS — CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK
480 Lexington Ave. New York, N. Y. Reno, Nevada
810 Park Bldg. Fifth Avenue Pittsburgh, 22, Pa. Carnegie, Pa.

FOR SALE

100 K.W., 1200 R.P.M., 250 volt d.c. Westinghouse Rotary Converter with Transformers and Switchboards
200 K.W., 550 volt, G. E. Converter
3—165 KVA, 6600-445 volt, G. E. Converter Transformers
I/R 7 x 7 Portable Air Compressor
450 H.P., 2300 volt, 3 phase, 60 cyc. G. E. Synchronous Motor Panel complete
Distribution and Current Transformers
5 ampere, 110 volt, Watthour Meters
Oil and Manual Air Circuit Breakers
300, 300 & 600 A, Disconnecting Switches
5 Ton Reading Multiple Gear Hoists

District Representative for:
I-T-E Circuit Breaker Company
R. H. Benney Equipment Company
Norwood 12, Ohio

Uncovering GOLD Nuggets in the Coal Fields

Stripping jobs, conducted at high speed—and with ECONOMY—afford a field for Heavy Excavators no less alluring than the search for gold.

For, a well-equipped, well-managed job of stripping brings high cash returns—without the element of high risk. Proper equipment is a cardinal point for success in stripping—and that's where ECONOMY COMPANY can work with you.

Our facilities, from Coast to Coast have lined-up for Coal Strippers a noteworthy group of big draglines and shovels for the actual stripping, and numerous smaller shovels, from 2-yard to 1-yd. (or ¾-yd.) dippers, for loading operations.

Wire or phone us for full details on any of the stripping, loading or hauling equipment listed below—or tell us what you need. We'll give you an inspection at any time.

REAL BUYS IN COAL STRIPPING SHOVELS AND DRAGLINES

3½ yd shovel with 75' boom and 48' dipper stick—3½ yd dipper bucket—Model 175B Bucyrus-Erie—$20,000. has been spent by one of the largest fuel concerns on this steam shovel to put it in real condition, and they are offering it for sale for $10,000.00. This is the greatest bargain we know of and we recommend it be investigated promptly.

4 yd combination shovel and dragline—105' dragline boom in 4 sections—32' shovel boom—4 yd dipper bucket and 4 yd dragline bucket—Model 100B Bucyrus-Erie—price attractive.

3½ yd Monighan Walker dragline with 100' boom. This machine has been rebuilt entirely. New type crawlers. Brand new boom and brand new 200 HP Fairbanks-Morse diesel engine. It will pay you to investigate this machine.

A COMBINATION: One 3 yd Monighan diesel dragline powered by Cummins 200 HP diesel engine, 90' boom and one 1 yd General loading shovel. Both machines can be purchased at an attractive price.

1—3 yd Marion 40A diesel dragline—95' boom—a Waukesha diesel engine.

1—15 yd Bucyrus-Erie tower machine—ideal for stripping work on level ground.

1—7 yd Bucyrus-Erie 175B shovel with 65' boom and 42' dipper stick.

2—5 yd Bucyrus-Erie 120B shovel and dragline combination—dragline boom 80' (could be extended) 4 and 5 yd dipper buckets and 5 yd dragline bucket.

1—4 yd Marion Model 4160 shovel—electric powered—34' shovel boom—24' dipper handle.

1—4 yd Marion Model 37 electric shovel.

2—2½ yd Marion Type 125 electric shovels.

1—diesel 2½ yd shovel and dragline combination—2½ yd dipper bucket—2½ yd dragline bucket—ready for immediate shipment Bucyrus-Erie Model 48B—Price $23,500. FREIGHT PREPAID to any part of the United States.

1—43B 2 yd Bucyrus-Erie dragline rebuilt and one 2 yd Bucyrus-Erie 43B shovel.

1—2 yd 50B Bucyrus-Erie diesel shovel and dragline combination at a bargain price.

1—2½ yd Marion electric shovel.

1—8 yd steam dragline with 165' boom—Bucyrus-Erie make.

1—4 yd Bucyrus-Erie steam shovel on cats—general condition exceptionally good—Price right.

1—3½ yd Marion steam shovel with 65' boom—40' dipper stick—ready for immediate shipment.

In addition to the above we have quite a selection of small, medium and large loading and stripping shovels and draglines.

WRITE, WIRE, or PHONE to us immediately, and we will supply any additional information you require, or present a detailed description of any other stripping equipment you might be interested in.

DUMP TRUCKS and TRAILERS

12—24 yd White Rear Dump Trucks built in 1939.
2—21 yd Euclid diesel bottom dump trucks Model 5LDT.
3—18 yd Model 4LDT Euclid diesel bottom dump trucks.
3—20 yd Six-wheel diesel Maxi two-way side dump trucks model 140.
18—13 yd Euclid diesel bottom dump trucks, 3 Model 17FDT. 6 FDT. 5 are 25FDT.
3—14 yd Oshkosh "Earthmovers" Model RXC with 128 HP engines with semi-trailers 10 yd water level capacity or 14 yd heap.
2—12 yd Euclid, end dump trucks diesel Model FD.
8—8-12 yd 1942 diesel Federal Dump Tractors and Trailers Model 29—8 yd water level.
5—12 yd Euclid Bottom Dump gas trucks Model WCL.
2—12 yd International Dump trucks Model DR-70 gas.
2—Autocars 12 yd dump bodies.
6—11 yd Sterling Rear End Dump Trucks Model HCS.
4—8-12 yd Euclid Bottom Dump Trucks.
3—10 yd Euclid diesel bottom dump trucks.
5—9 yd Euclid diesel bottom dump trucks.
2—8 yd Sterling Model DC and 140 dump truck.
6—4½ yd General Motors Dump and Cab trucks gas.
3—15 ton Model LZWCL Euclid Gas Bottom Dump truck Tractors.
18—Heavy duty International dump and Supply trucks.
4—6 yd A6 International Dump trucks with sideboards.
6—1937 6-10 yd Heavy-duty Mack dump trucks—special rock body.
1—AC 5-ton Mack dump truck.
1—1937 5 yd E. H. Mack dump truck.
4—5 yd HD140 Sterling dump trucks.
2—5-6 ton Chevrolet dump trucks.
2—5 yd White 702 dump trucks.
1—4 yd 10S Ateco Hydraulic Dirtmover.
2—4 yd 1937 Mack trucks.
1—5 yd Studebaker dump truck
18—4-5 yd 1942 New Ford Dump Trucks with Thornton tandem drive.
4—12 yd Model FDT diesel Bottom Dump Euclids.
2—Model 120 Koehring trail dumps diesel.
1—3½ ton Mack truck.
1—3 yd 1939 International Model D-30 dump trucks.
1—3 ton 1940 Ford 10 yd tailgate—8 yd sides.
1—3 yd 1939 Chevrolet.
3—2 yd Studebaker Chassis complete with Dempster-Dumpster unit—equipped with five 2 yd buckets.
1—2 yd 1940 Chevrolet Dump truck.
1—2 ton White Dump Truck.
1—1½ ton International Dump truck.
1—1½ ton 1939 D-30 International truck.
One Lot of 2½ ton dump trucks—one 1940 2½ ton Brockway—one each 2 ton Brockway, International, Reo and Autocar.
One Lot of Ford Dump Trucks—One 1942 Ford, 5 1941 Ford, 4 1939 Ford, all 1½ ton and one 2 ton Ford dump truck.
One Lot consisting of one each 2 ton 1937 White Dump truck, 5 yd 1939 Ford Dump truck, 5 yd GMC 1938 dump truck, 4 yd 1937 Chevrolet 4 yd 1935 Ford and ½ ton 1936 Ford pickup dump truck.

KOEHRING DUMPTORS

3—5 yd Koehring Dumptors Model W85.
3—5 yd Koehring Dumptors gas.
2—5 yd Koehring Dumptors Model 55.
1—1940 Koehring Dumptor 7 yd.
2—10 yd TD-120 Trail Dump Koehring Tractors and Wagons.

TRAILERS

1—low bed trailer 12 tons with Chevrolet Tractor.
1—Standard low bed semi-trailer Model LOB 33.
1—Herman dump trailer.
1—8 ton 20" boom trailer crane.
1—Caterpillar 60 logging cruiser.
1—International truck with a Fruehauf trailer 30-40 ton.
1—Mack tractor with Rogers 40 ton low-bed trailer.
1—Mack Tractor and Rogers semi-trailer.
1—18 to 22 ton pneumatic tired low-bed machinery trailer.
1—1941 Fruehauf 14' dump trailer 15½ yd capacity Model Y214.
1—Diamond T 60 ton trailer and tractor.
1—Federal Tractor and dump trailer.
4—tool trailer shop made—1000# capacity.
1—single axle Wentwin Trailer log bunks.
1—35 ton Williams trailer.
1—Trasco trailer.
1—Rogers trailer 40-50 ton.
1—1928 Fruehauf trailer.
1—15 ton Rogers trailer Model 4-GN-15.
1—10 wheel C-55 International Tractor with semi-trailer—25 ton capacity.
6—7 yd Insley dump trailers.
1—1938 Martin semi-trailer.
1—Martin 1937 tandem semi-trailer.
1—AC Mack 5 ton dump truck.
2—Athey Model E-12 bottom dump trailers.
1—KS7 International tractor and dump trailer.

In addition to the above itemized listing, we can probably take care of everyone of your requirements of any type of mining equipment and it will be to your advantage to forward your inquiries to us, or call us on the phone for prompt action.

ECONOMY COMPANY, INC.

49 Vanderbilt Ave., N.Y.C. **Tels. MUrray Hill 4-2294-8292-2295-2296**

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

4—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter
12 G3 Goodman AC Shortwall, 220/3/60.

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors, Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

1—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V, 36" or 40" Ga.
18 Ton Westgh. 500 v. 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.
2—6 Ton G. E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

Rotary Con. & MG Sets (3 ph. 60 cy.)

2—300 KW G.E. HC 12 Rotary 275 v. 6 ph. with 2300 v. 3 ph. Trans.
200 KW Ridg. 275 v.—300 HP Ridg. 2200 v. Syn.
150 KW G.E. 275 v.—225 HP G.E. ATI 2200/4000 v. .8 P.F.
100 KW G.E. 275 v.—150 HP G.E. ATI 2200 v. .8 P. F.
75 KW G.E. 125 v.—125 HP G.E. IK 220/440 v. sq. cg.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 v. DC Westgh.—Skinner Engine.
65 HP Primm Oil Engine belted to AC or DC Generator.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine.
50 KW West. 125 v. DC—Skinner Engine.
50 KW 125 v. DC West. Turbo Gen.

TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V.
31	7½	"	"
28	10	"	"
3	50	22000	2200

HOISTS

100 HP American sgl. fr. drum—AC Motor
75 HP Lidgerwood sgl. fr. drum—AC or DC Motor
50 HP Thomas sgl. fr. drum—AC or DC Motor
30 HP Carlin double dr. fr.—AC or DC Motor

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG.	Type
500	G.E.	450	S.R.	MT 412
300	West.	1750	S.R.	CW
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
200	West.	900		Syn.
187	G.E.	600	S.R.	I-M
150	G.E.	600	S.C.	I-L
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	G.E.	720	S.C.	I-K
125	Al. Ch.	720	S.C.	
100	West.	1750	S.R.	CW
100	Al. Ch.	690	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C.	
60	Lincoln	900	S.C.	
50	G.E.	1200	S.C.	KT
40	Triumph	1800	S.C.	TR 11

Other sizes down to 1 HP

DC MOTORS—230 VOLTS

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109
130	G.E.	550	ser.	CO 1812
100	G E.	480	ser.	MD 108
60	G.E.	600	ser.	CO 2507
25	West.	600	cp. wd.	SK 130
25	Reliance	850	cp. wd.	185 T

COAL CRUSHERS

30 x 30 Jeffrey sgl. roll
18 x 24 and 18 x 30 New Scottdale dbl. roll

MOORHEAD-REITMEYER CO., INC. **Pittsburgh 19, Pennsylvania**

FREIGHT CARS OF ALL KINDS!

8—Hopper, Twin, 50-Ton
40—Hopper, Triple, 50-Ton
50—Hopper, Side-Discharge, 50-Ton
50—Refrigerator, 40-Ft., 40-Ton
16—Refrigerator, 36-Ft., 30-Ton
50—Box, 40-Ft., 40-Ton
10—Dump, Magor, Automatic, 30-Yd., 50-Ton; lift doors
3—Dump, Western, Automatic, 30-Yd., 50-Ton; lift doors
3—Dump, Western, 20-Yd., 40 & 50-Ton; steel floors
1—Dump, Koppel, Drop-Door, 20-Yd., 40-Ton; steel floors
70—Gondola, All Steel, 40-Ft., 16 drop doors
6—Gondola, 50-Ton, High-Side, Steel
10—Tank, 8000-Gallon, 40 & 50-Ton

All cars are priced to sell!

IRON & STEEL PRODUCTS, INC.

40 years' experience

13484 S. Brainard Ave., Chicago 33, Ill.

"*ANYTHING* containing IRON or STEEL"

ELECTRIC LOCOMOTIVES

1—13 Ton GE with HM-829 motors.
1—13 Ton Jeffrey, 250 V, steel frame.
1—10 Ton GE steel frame, 250 V, HM-830-A motors.
1—6 Ton West. bar steel frame with 904-C, 250 V motors.
2—6 Ton GE with HM-823 motors.
1—5 Ton GE ready to operate, 42" ga.
2—5 Ton Goodman 250 V, 36" ga.
1—4 Ton Jeffrey MH-96 motors.

COAL CUTTING MACHINES

1—124EJ Goodman, 50 HP, 250 V, permissible track mounted slabbing machine.
1—35B Jeffrey 250 V shortwall.
1—35BB Jeffrey AC shortwall.
1—35B Jeffrey 500 V shortwall.
1—12DA Goodman, 50 HP, 250 V D.C.
1—12G3 Goodman, shortwall, 3/60/220 V, A.C.
1—12AB Goodman shortwall, 250 V, D.C.
1—36B Jeffrey, 250 V, 14" high.

MISCELLANEOUS

1—7BU Joy Loader, 250 V D.C.
1—240 HP Cummins Oil Engine to 125 KW 3/60/240 generator, 720 RPM.
1—165 HP GE Syn. 2200 V, 900 RPM motor.
1—Joy Shuttle Car.

Send us a list of any equipment you may have for sale

TIPPINS MACHINERY CO.

Pittsburgh 13, Pennsylvania

MINE HOISTS

1—Vulcan Keyed drum 30" dia. Will coil 2500 ft. ¾" rope. 50 HP Motor.
1—Vulcan Band friction 42" dia. Will coil 3000 ft. 1" rope. 100 HP Motor.
1—Vulcan Man Hoist, 72" dia. Suitable 300 ft. shaft. Motor to suit conditions.
1—Nordberg Shaft Hoist, 72" dia. 150 HP Motor.
1—Vulcan Cylindro Conical Shaft Hoist 7'-9"—350 ft. wire rope. 400 HP Electrical Equipment.
1—Ottumwa haulage hoist, 84" dia. Will coil 10,000 ft. ⅞" rope. 400 HP Motor.

And other hoists to suit all mining conditions.

JONES MINING EQUIPMENT CO.

541 Wood Street, Pittsburgh 22, Pa.

DeLaval Steam Turbine and Centrifugal Pump Unit

Turbine-Type TC #30209, Steam Pressure 150, Speed 1170, Exhaust Pressure 28" Vac. Pump—Type 2 P6—Total head 286, Speed 1170. Gallons per minute, 1050. Cheap For Quick Sale.

ACORN IRON & SUPPLY CO.

911 N. Delaware Ave., Phila. 23, Pa.

MINING MACHINES

AC & DC

REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

2-yd. Industrial Brownhoist Link-Type Coal Grab Bucket.

Electric Coal Drills, Mine Fans, Pumps, Tipple Scales, etc.

2—Ironton 5-ton Storage Battery Locomotives

Equipment of all kinds

Buy, Sell or Exchange

THE INDUSTRIAL EQUIPMENT CORP.

Warehouse: Carnegie, Pa.

P. O. Box 1647 Pittsburgh 30, Pa.

LIQUIDATION!

We are liquidating six complete power plants, just purchased from the Georgia Power Company, including:

22—High Pressure Water Tube Boilers, 200 to 600 H.P.
8—Turbo Generator Sets, condensing, from 275 to 2750 K. W.; all auxiliary equipment.

Above equipment operating as late as Dec. 1944.

SPECIAL

14—Linn Model DA10 Boulder Dam Type Rear Dump Body HAFTRAKS, 11 equipped with Cummings Diesels, 3 equipped with Hercules Gas Engines.

Units were purchased new in 1942.

REPUBLIC TEXTILE EQUIPMENT COMPANY

40 Worth Street New York 13, N. Y.

Georgia Office: Associated Metals, 349 Decatur Street, S.E. Atlanta, Ga. Walnut 9412, Main 5738

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48 In. CONVEYOR BELTS

1700 Ft. GOODYEAR 48 In. Wide 8 Ply 36 Oz. 3/16 Top 1/16 Bottom.
Excellent Condition.
IMMEDIATE SHIPMENT

R. C. STANHOPE, INC.

60 East 42nd St. New York 17, N. Y.

DRAGLINE

6 yd., 175' Boom, Steam, $25,000 Net Cash.

LEWIS-CHAMBERS CONSTRUCTION CO., INC.

Carondelet Bldg., New Orleans, La.

FOR SALE

STEAM SHOVEL

20B. Bucyrus Caterpillar Traction. Good condition. Boiler completely retubed. N.J. State inspected and approved. Present location near Easton, Pa. Price $4500.00.

P. S. KRAMER

7 Smith Street, Paterson, N. J.

16 YD. DRAGLINE:
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom.
AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 1000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1,500, 2200, 2000, 5000 ft.
(14) Gasoline, 10, 160, 220, 210 & 370 ft.
RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"
TANKS:
12,000 and 15,000 gal. and 20,000 gal.
CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 48 In. Large stock here.
STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.
TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale
TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8, 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex
CARS:
60—Western 16-20-30 yd. Side Dump
SHOVELS, CRANES & DRAGLINES:
2 yd. Monighan 60' Boom Walker
2—1½ Marion Diesel Elec. Shovels
2 yd. P. & H. Model 780 75' Boom Diesel Dragline
2—2¾ yd. 48B Diesel Shovel—Draglines
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
2—120B—4 yd. Elec. Shovel—Dragline
25 ton Browning 50' Boom Loco. Crane
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24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
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12"	4	1/16"	1/32"

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14"	6	8"	6	4"	5
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	25 "	10.00
	35 "	14.00
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	50 "	10.00	1.50 "
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6—Goodman 612 AB Shortwall Machines, 7½ ft. bars, 500 volt (purchased 1942).

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100	West.	CW	220/440	685
100	G.E.	MT-347	220	1800
75	G.E.	MT-347	220	1200
75	G.E.	I-M	440	1200
75	West.	CW	220/440/2200	580/290
50	Chand.		220/440	1800
50	Allis Chal.		220	490
40	Allis Chal.		440	860
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20	Westg.	CW	220	1735
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1½	Westg.	900	SK
1½	Robbins Myers	1750	
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2	Northern	1000	
2	Reliance	850	
3	G.E.	1700	RC-25
3	West.	860	CD
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
5	Westg.	1600	RC
7½	Cr. Wh.	875	
7½	Cr. Wh.	940	CCM
10	West.	1325	S
10	Cr. Wh.	875	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
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13	10	2200	220/110	G.E.
2	15	400/30000/50000		American
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2	50	6600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
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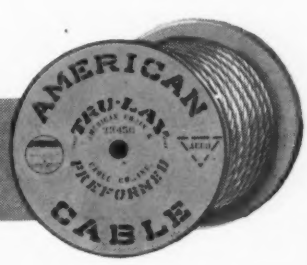

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How Raw Coal is Blended at Praco Preparation Plan

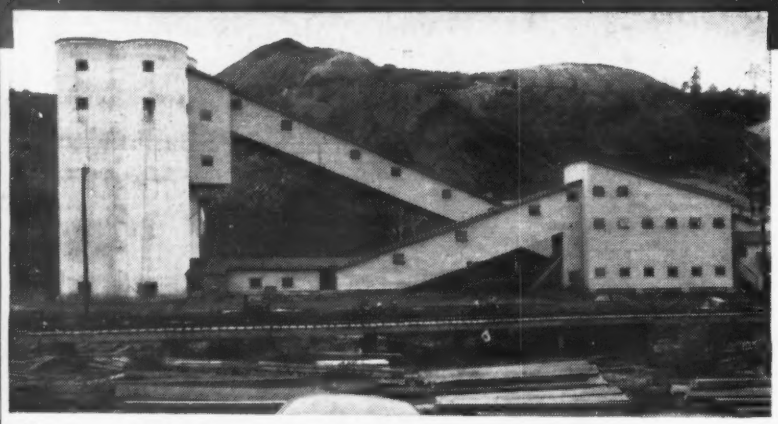

Fig. 1. **Nested System Adaptable To Either Layer or Spot Loading**

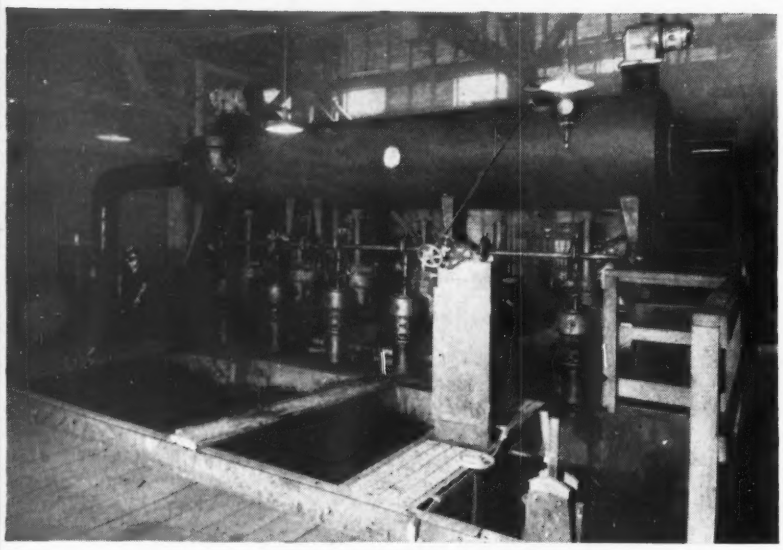

Fig. 2. General view of washing floor showing Link-Belt air-pulsated washing unit for cleaning 5" x 7/16" steam coal.

Fig. 3. General view of complete Link-Belt Preparation Plant for steam and metallurgical coal. From left to right are shown the mine-run storage and blending silos, a primary cleaning and crushing house, refuse bin feeding to two belt conveyors up the hill, and, at the right, the preparation sections.

● R.O.M. coal from three mines in the widely va able Mary Lee seam is blended prior to washing Alabama By-Products Corp.'s new Link-Belt prep ration plant. Four concrete silos with a combin capacity of 1000 tons, comprise the blending-stora bins. These reserve storage facilities also permit greater flexibility and maximum economy betwe mining and preparation shifts.

The system employs a minimum of mechanic equipment with a consequently lower initial co It reduces segregation and improves uniformity sieve, moisture and chemical characteristics of t raw coal.

Raw coal from the dump hopper is carried by b conveyor to a swiveling chute at the top of the silo (Fig. 1). This chute is oscillated back and for over each silo as it feeds, with the coal from ea trip of cars going to a different silo. Operation the chute is controlled by the dump house operat

Since coal from different sections of the mi radically differs in sieve and chemical analyses, t coal deposited in each silo is of different quali sieve analysis and moisture content. Feeders at t bottom of each silo feed simultaneously to a b conveyor, which delivers to the preparation pla In this manner the entire mine production of c is blended.

This blending of the feed accomplishes two i portant results in washing:

(1) The feed rate is constant, permitting grea operating efficiency of the washery.

(2) The washed coal product is therefore mo uniform with respect to both ash and sulph contents.

Why not gain these advantages for your outp by incorporating blending into your flow sheet Link-Belt's wide and varied experience and facilit are available to you.

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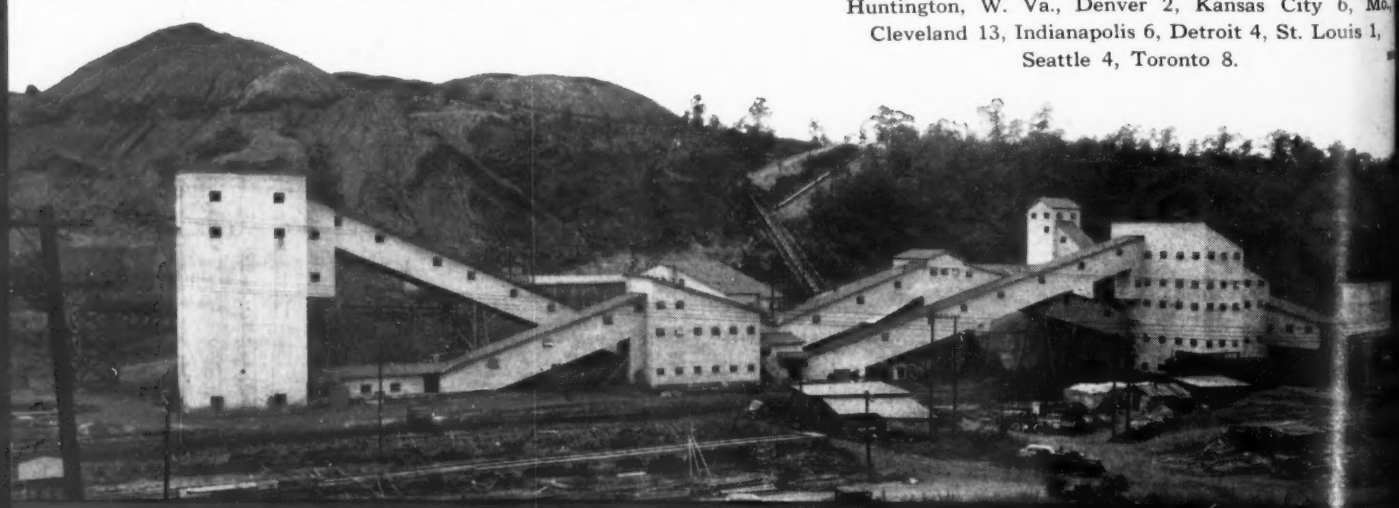

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